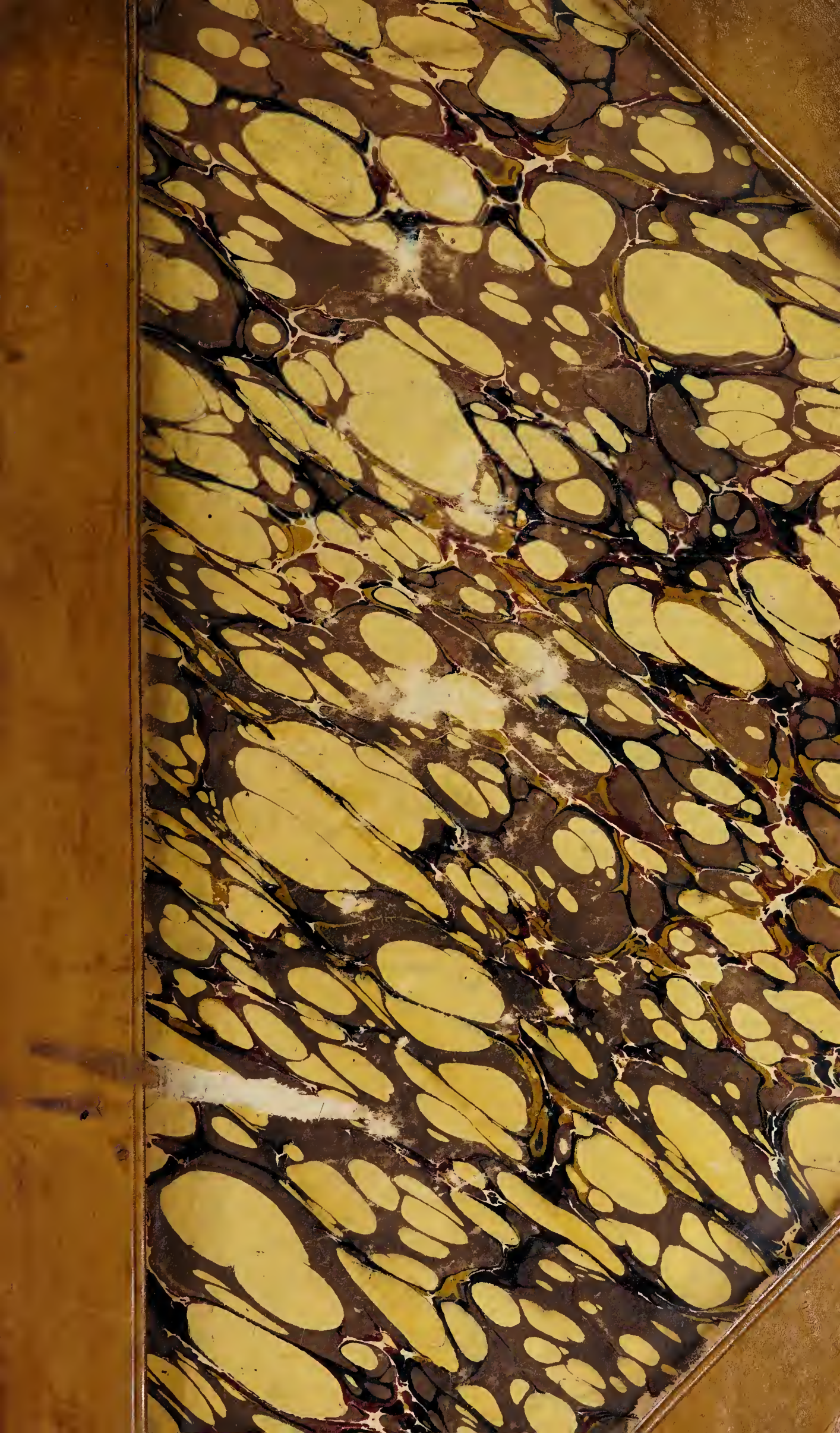

TRANSACTIONS.

SESSION SEVENTH,

1856-57.

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TRANSACTIONS

OF THE

ARCHITECTURAL INSTITUTE OF SCOTLAND.

SESSION SEVENTH,

1856–1857.

VOLUME V. PART I.

EDINBURGH:

PRINTED BY W. H. LIZARS, 3, ST. JAMES' SQUARE.

M.DCCC.LVIII.

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INTRODUCTORY ADDRESS.

Transactions of the Architectural Institute of Scotland,
Session, 1856–57.

INTRODUCTORY ADDRESS

BY

THE HONOURABLE LORD NEAVES.

[*Read at the Annual General Meeting of the Architectural Institute of Scotland, held on 1st December* 1856.]

Gentlemen,

It seems peculiarly fitting and right, that in our own country and city, an Association should exist for the encouragement and promotion of Architecture. Throughout the whole extent of Scotland, from Melrose to St. Magnus, and even to Mousa, there is a succession of objects of architectural interest, far more numerous and important than had ever been imagined, until the taste and diligence of recent inquirers had brought them to light. In this city, there is an abundance of architectural specimens of all kinds, old and new, as well as good and bad; while the locality itself, from the picturesque and varying nature of the ground, and from the excellence of the building material, affords the most favourable scope for the exercise of the art. It would be discreditable, in such circumstances, if Architecture did not receive a share of our attention, and

if we did not do all in our power to cultivate a correct judgment on the subject, so as to enable us to appreciate the examples of excellence which we possess, to add to their number as opportunity offers, and to avoid falling into those failures and deformities which mistaken views of the art are sure to produce.

It cannot be said, that the true principles of architectural beauty and success have yet been so clearly fixed, as to command universal or even general assent. The art is attended with great and numerous difficulties, both practical and theoretical. We cannot, indeed, look at the various buildings in our own city, without seeing the unsettled state in which architectural feeling has long been, and still remains. We see a diversity of styles and modes, which plainly show, that men have been groping their way to an object of which they felt the importance, but which they knew not well where to find, and which they have too often failed of attaining. We see imitations and mixtures of all possible schools, with occasional attempts at originality; and we see elaborate structures, which we have no doubt their authors thought *ought* to be viewed with pleasure, but from which no pleasure is received by any one. What affords a remarkable and instructive lesson, we see plans of streets and buildings, devised upon a rigid system of uniformity, but where the chief attraction is now found in the open violation of those rules which their projectors had laid down. In the midst of this chaos, where success and failure are so strangely jumbled together, it may be permitted, even to an unskilled and unexperienced thinker, to state some of the views, which, though not pretending to be original, have most strongly impressed his own mind, in aiming at an architectural standard, and which, whether right or wrong, may do something to forward discussion, and to help in

maturing the formation of a sound code of architectural criticism.

It is a common and elementary, but a most important observation, that of all the fine arts, Architecture alone is founded upon utility, and even indeed upon necessity. We might do pretty well without painting or sculpture. With no music in our souls, we should no doubt be fit for treasons, stratagems, and spoils; but yet we might live in a rude and discordant kind of comfort; and it is certain, that many persons walk about and prosper without a particle of poetry in their composition. But without *houses*, we could not live at all. Even the naked Negro, panting at the line, must have his cabin. The Hottentot and Greenlander would perish without their kraal or hut, while the whole civilization of the European, his whole progress in art, science, and philosophy, is connected with his being *comfortably lodged.* It is true, that building is not Architecture, but there can be no Architecture without building. Architecture is the art of building *well and beautifully*, and the usefulness of the building is the basis upon which the beauty is reared. Even monumental Architecture, which is the least useful kind, must still have its own use in the practical purpose which it is intended to serve; and all edifices, properly so called, must be of use, otherwise they had better not be at all. In so far as beauty is thus engrafted on utility, the architect only follows a universal tendency of nature. The Divine Goodness has not been content with giving us merely things that are of use; it has added beautiful forms and colours to natural productions, and has everywhere accomplished the great problem of combining the useful and the agreeable. But in useful things, the beauty that is added is a mere appendage and accompaniment to the primary element. It springs up and breaks forth, like a foliage or efflorescence,

adorning the dry substance or trunk of the thing itself; but it does not supersede it; and the ornament does not become a substantive or separate existence.

In the same way, it seems clear, that in Architecture, beauty must ever be so far subordinate to use, that it shall never supplant it, or set up for itself, and that there shall be no prominent or important parts of a building, where the utility cannot be plainly seen conspicuous in the midst of the beauty. The style and the manner, the vacant places and intervals of a building, may be the appropriate openings for embellishment, and a natural genius and taste will twine its ornaments, like a wreath, wherever they can be suitably and safely placed. But the great outline and plan, and all the principal parts of a structure, will be devised upon an intelligible and consistent scheme of utility, with which no mere love of ornament should be suffered to interfere.

In planning any structure, so as to be suitable and serviceable, a judicious architect will necessarily look carefully to the whole circumstances of his situation, to the purpose which his building is to serve, to the locality in which it is to be placed, to the climate to which it is to be exposed, to the people by whom it is to be used or beheld. It follows, from this obvious consideration, that nothing is more hazardous than to transplant Architecture from one country or climate to another, or to revive the Architecture of one age amidst the altered opinions and feelings of a succeeding one. This, however, is what we constantly see done, and this is one great source of the architectural failures of our own time and country. It is thought, that an object which was once admired as beautiful, or which we ourselves admire, while under the influence of local or traditional sympathies, will be beautiful anywhere, even where those circumstances

or sympathies cease to exist. But nothing can be more erroneous, or show a greater ignorance of art and human nature; and above all, when such imitations are not only injudicious in themselves, but are lame and imperfect, as they often must be, or are combined and crossed with heterogeneous and incompatible mixtures, the effect produced is either lamentable or ludicrous.

I think it may be laid down as a certain fact, that all great architects, or great schools of Architecture, have, in the styles which they have adopted, been animated by the presence and influence of some clear, definite, and noble idea which they sought to realize. Any imitation, therefore, of their style, where the guiding idea is lost, must inevitably be unsuccessful. Let us attempt to point out some obvious illustrations of this truth, and let us begin with an extreme instance to make it more conspicuous.

The proper intention and object of the Egyptian Pyramids is a matter of doubt or obscurity; but we think it clear, that whether they be regarded as sacred or as sepulchral structures, their architects must have had in their minds some design or conception, such as I would now describe. They must have aimed at representing something higher than earthly things — something larger and loftier than the ordinary works of men — something more enduring than the frail and fleeting objects of every-day observation. They might also have some physical purpose in view, or some idea analogous to that which is said to have prompted men to aspire to heaven, or led them to erect a ladder, by which divinities might descend to earth. But with any such thoughts, there must, I think, have been joined, the great design of presenting to men's minds a type of something beyond the ordinary limits of man and his corporeal frame — a type which should exhibit

magnitude, elevation, and stability, in a degree transcending what was to be seen around it. Whether the ideal object intended to be indicated was that of the Deity, or of Mind and its influences, or of the Soul and its immortality, there was here a sublime and solemn truth sought to be realized in a noble and impressive manner, and all the means employed were suitable to the end in view: Colossal size, solidity of form, simplicity of style, and contrast of situation, being the distinguishing and appropriate features of this architecture.

It is plain, that this effect of the Pyramids depends on their actual bulk and relative position. If they were placed amidst mountain scenery, or on undulating ground, instead of rising at once from a flat and extended plain, their character would be destroyed, and if they were greatly reduced in size, the result would be equally fatal. A *little* pyramid put down among rocks or overhanging eminences, would not be sublime but ridiculous. The mere preservation of proportion would be of no avail, the essential character of the structure depending partly on its absolute size, and partly on its contrast with the surrounding levels. The attempt, for example, to erect a pyramid in Edinburgh, and still more, to do so on a reduced scale, would be a lamentable failure, and would excite the idea, not of grandeur but of littleness. It would be an obvious instance of the impropriety of transplanting or adapting any style of Architecture, without due regard to the altered circumstances in which the attempt is made.

Such an injudicious proceeding is not likely to occur, but it may deserve consideration, whether we do not see other instances of removal and alteration, which in principle, and to the eye of true taste, are equally objectionable. The structure, which will please or astonish in one kind

of locality, may be odious or absurd when repeated in another.

The origin and peculiar objects of Gothic Architecture, particularly of an ecclesiastical kind, are also involved in some obscurity, but in a general way are intelligible enough. They were intended, first of all, to express reverence and love towards the Supreme Being. I daresay, that some false and superstitious views were mixed with higher motives in the minds of their founders and architects. They may have thought that there was some positive merit, some supererogatory service in such sacred and laborious erections; but I will not be so uncharitable as to doubt, that with many at least of those who thus exerted themselves, the motive was neither the hope of bribing the Divine justice, or of buying the Divine favour, nor indeed any other consideration, than the wish of a pious and Christian soul to honour its Maker and Redeemer, and to show the best proof in its power of its love and gratitude, by devoting its talents, skill, and worldly means, in constructing an edifice, fit and suitable for the exercise and advancement of religion. In this feeling it would be well if we imitated our ancestors, though I do not say that we should take exactly the same method of giving expression to it.

But it is obvious, that there were specialties in the opinions and objects of the Middle Age Architects with which we cannot so fully sympathize. A Gothic Cathedral was intended as a shelter and resort of great multitudes, who might come to attend and witness, almost as in a theatre, the celebration of rites and ceremonies, by which, indeed they were, as they believed, to be deeply benefited, but in which they were not to take a personal or prominent part. The great sacrifice, which was the foundation of their religion, was to be repeated or represented by a

peculiar class of privileged persons on behalf of the rest, while the people stood apart, not joining in the ceremony, except as partial and transient recipients of it results, and relying more on an implicit faith than even an intelligent comprehension of what might be done or said. This idea was in itself solemn and sublime, but different, it must be obvious, from the more prevailing opinions in our own age and country under the Reformation.

Again, there may not be good ground for supposing, that the peculiarities of Gothic Architecture were suggested by the natural arcades or colonnades of woods and groves; but it seems clear, that when the pointed arch became the favourite roof or heading in a Gothic building, the natural form of sylvan scenery, with its stem, its branches, and its foliage, came easily to coalesce with the Gothic style, and the love of nature which distinguished the architects of the North, prompted them to make a free use of this beautiful analogy. It may even be, that the semi-paganism which survived the imperfect conversion of the northern nations, led the builders to imitate, in their cathedrals, some of the thick gloom of those woods, in which Thor and Woden had been worshipped, and which might seem not unsuitable to their idea of the mysteries of the new religion, or to the devotional feeling generally.

If the cathedrals of the middle ages, and in particular those of Northern Europe, were built upon conceptions such as these, it must be obvious how difficult, or rather impossible, it is to adapt that ancient style of building to the uses of Protestant worship of modern times. Without speaking of different religious opinions in this place, except as existing facts, and therefore as necessary *data* in architectural criticism, it is clear that the two things are, in many important points, dissimilar. A Protestant church is, in essential

character, a place of assembly for a congregation, who are to be simultaneously and continuously present, and who personally join in the prayers and praises that are offered — the minister being, for the most part, only their prolocutor, as far as their devotions are concerned. Again, it is an essential portion of Protestant worship — at least so it appears to me and to many Protestants — that there should, uniformly or statedly, be not merely a reading of the Scriptures, but a sermon or discourse to the people — the minister here performing the function of a teacher to the congregation. I do not wish to depreciate the inestimable value of public or common prayer, but still, taking leave to express my own opinion with the same freedom which I would concede to those who differ from me, I repeat my conviction, that preaching must be, not a paramount, but a prominent ingredient in Protestant church service, and that it is, in fact, one of the main tenures and safeguards of the Protestant faith. I happen to think, though here especially my opinions may be singular, that preaching is even more essential to the existence of a Protestant *liturgical* church than of any other; for with all their excellencies and recommendations, the tendency of liturgies, in some minds, is to degenerate into routine; and I think it is apt to happen with characters too frequently met with, that unless there be impressive preaching, there will be either a mere dead formalism, or craving after fanatical excitement on the one hand, or the opposite extreme of multiplied and mysterious ceremonial on the other. I make these remarks in no spirit of controversy, but with a direct bearing on architectural taste in connexion with such views as I have indicated.

A Protestant church must, in order to please, be of suitable size and construction, so that all may easily see and hear, and that all may be commodiously arranged, without

distraction and without discomfort (the days of catacombs and of hillsides being now gone by), and so, at the same time, that the minister or preacher should be able to speak impressively to all his audience, without an undue strain upon the organs of human utterance. How this is to be best accomplished I give no opinion. I doubt whether an oblong building, with the pulpit in one corner, is a very good arrangement; and except where the rules or traditions of particular churches interfere, I should say the preacher's best place was in some central point of the side, opposite the entrance. But whatever others may think, I at least entertain no doubt, that the style of an old Gothic Cathedral is not well suited for a modern Protestant church. A cathedral on the full mediæval scale seems out of the question, and I have a general distrust of miniature imitations, particularly of buildings in which sublimity is part of the original character. As I before suggested, by reducing the scale you are sure to lose the sublimity; and you will scarcely retain the beauty if you lose also the appropriateness. The Protestant church keeps up no distinction, such as the early church had, between its different members, and there is therefore no propriety in any longitudinal divisions of the church, except for mechanical purposes of support, which of course are very different in a large church and in a small one. I now speak of ordinary Protestant churches. I am not sufficiently acquainted with the subject, to know what are the essential requirements of a Protestant Cathedral, with a special regard to episcopal and capitular purposes. I have sometimes looked at St. Paul's with that view, and it occurred to me, that a considerable part of it, however noble and sublime, is not very obviously devoted to proper ecclesiastical uses. But perhaps St. Paul's ought not to be viewed as a Protestant Cathedral, if it be true what has been said, that the architect's

own plans were overruled by James II. when Duke of York, in the anticipation of a national return to the old religion. In the mean time, however, I wish to confine the application of my remarks to an ordinary parochial or congregational church. There may be many forms of Gothic architecture suitable to any kind of church, for the Gothic architect was a man of infinite variety. But the cathedral was a building of its own class. When I see a genuine example of it, I love and admire it, and sympathize with the feelings which prompted and produced it; but when I see it transplanted to other soils, and stunted in its growth, I ask whether it is suitable to its new situation, and the answer is not satisfactory.

Another illustration of the views I have above offered may be found in the feudal Architecture of other times. The baronial castle, a few centuries ago, was built upon principles perfectly clear and consistent. It was a stronghold, intended not perhaps to stand a regular siege, but at least to protect the owner and his goods, or possibly also the goods of his neighbour which he had carried off, from the sudden incursion of a rival baron, whether dictated by revenge or the desire of retaliation, by the love of plunder or by personal hostility. The castle, therefore, was so fashioned as to present no weak or assailable point, and to be overlooked in all its outline by bastions, turrets, and other projections, which exposed any attacking foe to the weapons of those within. It necessarily followed in the prosecution of this paramount object of strength and security, that considerations of elegance and convenience were, to a great extent, sacrificed, and any indulgences of this kind could appear only in some inner court, or other part of the building which was not exposed to attack.

A feudal castle of the best kind, and in the best situation, is an object of great and picturesque beauty, but it

is clear, that if we begin to apply that style to modern residences, we shall fall into great absurdities. The barons or large proprietors of the present day, are not in the habit of stealing their neighbours' cattle, or of having their own stolen in that way, and although the numbers and dexterity of the ticket-of-leave class may require some peculiar precautions, it is not now necessary that country gentlemen should live in fortresses. If this be so, the element of convenience, which was formerly subordinate, becomes now the principal and prominent object of attention; and it follows, that if a country residence is to be mainly built with a view to comfort and convenience, it is absurd to give it at all an appearance of strength, which can never be consistently carried out. A building here and there, bristling with battlements, and frowning with towers, but of which the exterior elsewhere presents an extended curtain of weak undefended wall, with large windows, or with glass doors, is an absolute monster. We should laugh at a great chain, of which many of the links were of massive iron, while the rest were of silken cord, for no such article can ever be stronger than its weakest point; in the same way, a castle is no castle at all, if you can plainly and palpably walk into any part of it with an application of ordinary force, and any mongrel composition of this kind is offensive to taste, because repugnant to good sense.

I do not say that in some modern buildings there may not be introduced a pleasing reminiscence of other times, in things no longer applicable; but such a feature, I should say, ought to be kept greatly in subjection, and I think it clear, that there ought to be no serious assumption of a character which is plainly contradicted on the very face of the edifice itself.

I have not extended these remarks to the Grecian style of Architecture, because I feel this to be an extremely difficult part of the subject; but I have a strong impression, that as to many of our colonnades and peristyles, an Athenian architect would smile as he looked at them, and ask the purpose for which they were there.

From what has above been said, it may clearly I think be seen, how very charily imitation should be resorted to. We must look to the *rationale* of all things, and before imitating another style of building, we must consider carefully our own climate, age, and country, the nature and object of the work we are engaged in, and how far the purposes and circumstances that exist here are the same as those of the model which we propose to follow. I think it cannot be doubted, that the great architects of the best times never introduced any considerable part or portion of a building without a plain and palpable purpose. They did not servilely transfer from one building to another, features which might be appropriate there, and inappropriate here. They imitated indeed often, but they imitated rather analogically than literally. They showed their genius in their power of change and adaptation, and still more, in that spirit which knew how to breathe life and beauty into those forms, of which the main outline was dictated and defined by utility. An architect of true taste, while adhering to the useful, and rejecting all useless excrescences, may clothe the skeleton of his plan with endless adjuncts of natural and suitable embellishments. The whole field of former Architecture, Greek, Roman, and Gothic, is open to him for that purpose, and may afford the most delightful suggestions; but after all, the body and essential characters of the work must be the growth and representation of the time, place, and circumstances in which it is individually brought forth.

As to the future prospects of Architecture, I do not know whether, in this country of Scotland, divided as it now is by so many religious sects, we shall ever again have any noble specimens of church Architecture. But we should always surely do our best, within rational limits, to bestow on a religious edifice as much beauty and fitness as may be in our power; and at all events, we must have nothing untrue, nothing pretentious, nothing absurd. In other styles of Architecture there may yet be ample scope for genius and taste. Individual residences admit of many varieties of beauty and embellishment. Public and municipal buildings will from time to time occur. Commercial buildings, the banks, or counting houses or warehouses of our merchant princes and companies, afford admirable opportunity for rich and impressive Architecture. Street architecture, according to modern requirements, is still in its infancy, and may become a source of the greatest pleasure, so long as beauty and utility walk hand in hand in the work. It seems not improbable, that ere long, a great part of the Old Town of Edinburgh will come to be rebuilt. The first object, of course, will be the improved accommodation to be afforded even to the poorest inhabitants; and we ought not again to have those lofty castles in the air, which were originally dictated by the limited bounds of a fortified town, but which, though at first sight appearing sublime, have truly an aspect of meanness to the intelligent eye, as suggesting ideas of great poverty and privation in the upper layers of inhabitants. But after providing every thing fit and proper in a domestic and sanitary point of view, it would surely be easy, at a moderate additional expense, to build ranges of houses, even of the poorer description, which in their aggregate mass, as well as in many of their details, would present an attractive and interesting aspect. I do not know

a task which an able architect would more covet, than the reconstruction of the Grassmarket of Edinburgh — a square or PLACE which has few equals in any of the cities of Europe.

It is one of the objects of an association like this, to encourage and direct architectural taste, so that it shall be most extensively and practically beneficial. In great cities, where the beauty of natural objects is so much excluded, it is especially the office of the fine arts to supply other feelings of pleasure that shall serve as a substitute. No one can doubt how much Architecture might be made subservient to this purpose, and particularly in our own town, beyond perhaps what has yet been accomplished. The time is come, when many fetters of narrow prejudice and imaginary restraint have been broken and have dropped off. Uniformity is not now the only object looked at; not one style but all styles are open to be adopted by us wherever any of them are suitable. In some the Grecian, in some the Roman may be preferable; and in almost all situations, there is room for the infinite variety and versatility of that old domestic and burgal Gothic, which affords, in suitable situations, such never failing interest, and to the Anglo-Saxon taste such congenial delight. Let us watch for opportunities of carrying out this taste — let us do all we can, collectively and individually, to bring the public feeling into harmony with it, and we may yet see, in a better form than ever, the development of architectural beauty around us, while we may have the consolation of thinking, that we are not looking at a whitened sepulchre, but that what is beautiful and picturesque without, is far more than ever the abode of health, convenience, and happiness within. With us art should keep pace, not with luxury among the rich, but with increased comfort and improvement among the poor; and

the best form of Christian art, is that which bespeaks a whole community, dwelling under the influence of Christian feelings, and sufficiently elevated and at ease, even in its humbler ranks, to appreciate and enjoy those pleasures which rise above the grosser senses, and which connect themselves with the intellectual powers and the moral emotions of our nature.

Transactions of the Architectural Institute of Scotland,
Session 1856-57.

No. I.

ON THE ELEMENTS OF ARCHITECTURAL BEAUTY, IN REFERENCE SPECIALLY TO THE RECENT STRUCTURES IN PARIS.

BY THE
RIGHT REV. BISHOP TERROT.

[*Read at a Meeting of the Institute, held in Edinburgh on 13th January* 1857.]

As the members of the Institute received with kindly attention an Address which I delivered to them last year, and in which I endeavoured to give some sort of form to the expression of the vague likings and dislikings with which minds, educated neither professionally nor æsthetically, contemplate the works of the architect, I have been emboldened to offer a second paper, intended to be written to the same purpose, and in a similar spirit.

Architecture, Painting, and Sculpture, are arts so closely associated together, that some have treated them as subject to the same æsthetic laws, and have gone so far as to maintain, that we have no good architects, and that the reason is, that our architects are only architects, and not architects,

painters, and sculptors, all in one. But in opposition to this hopeless view of the subject, it ought to be observed, that while Painting and Sculpture are in their very essence imitative arts, representing, or attempting to represent objects, either actually existing, or conceived in the mind of the artist, Architecture is not essentially imitative. The first profile drawn with charcoal on a wall, was a representation or imitation of an actually existing face; the first head moulded in wax or clay, was *intended*, at least, to be the permanent representative of some actual head; but the first house that was built, was no imitation of any thing antecedent to itself. It was no imitation of the hole in which the architect had previously burrowed, nor of the hollow tree which had previously sheltered him, nor of the cave, the wigwam, or the tent. At any rate, it was not built for the purpose of any such imitation, but solely for the purpose of affording a safe, dry, warm, comfortable residence. Much ingenuity has been thrown away in attempting to trace the imitative principles of Architecture, and by no one more ingeniously or more fallaciously, than by the late Sir James Hall, who found all the prototypes of Pointed Architecture in the natural or artificial arrangement of the twigs and branches of trees, and from whom Scott learned to speak of a Norman church as being built —

> ——— "before the art was known,
> The arcades of an alleyed walk,
> To imitate in stone."

But if Architecture be not an imitative art, if it have no natural immutable prototypes, where are we to look for the grounds upon which one building is to be pronounced better or worse than another? And perhaps we may profitably prepare the mind for attaining a satisfactory answer

to this question, by considering, previously, the judgments we form respeeting the beauty or deformity of another class of objects—the human figure and faee. With regard to the figure, no one can doubt, that it is contemplated with satisfaction, or in other words, that it is considered beautiful, when it suggests the idea of being perfectly suited to its purpose; that is to say, that it is adapted for the easy performanee of all corporeal action. A bodily deformity is an unpleasant object, not because it is a departure from a normal type, but because it unfits the man who is so deformed from performing certain actions of force or activity, as well as those men who are not affeeted with such deformity. Narrow chests, high shoulders, limbs of unequal length, a leanness which shows the absence of muscle, or a fatness, which shows that to earry himself is as much as the man can well perform — all these are manifestly the reverse of beautiful, because they are manifestly unfitted for such action as it is desirable every man should perform, and as most, or at any rate many men, can perform with comfort and facility.

The beauty, then, of the human form, depends upon its apparent adaptation to its purpose. We need not, indeed, deny all truth to the systems whieh profess to define beauty by certain eombinations of definite angles and proportional length of parts; but it is very certain, that the sentiment of admiration is excited, not by the perception of such mathematical relations, but by the perception of fitness for a desirable purpose.

We may, I think, reason in the same way, respecting arehiteetural beauty and deformity. That building is good, whieh satisfactorily serves its purpose and appears to do so, whieh possesses both real and eonventional suitableness. For example, if we admire the new Houses of Parliament,

it is not because the length bears a certain proportion to the height, but because it looks like what it is, the seat of the great council of the nation. If, to take an example nearer home, we do *not* admire the large windows, with circular heads, on the west side of Charlotte Square, it is not because there is any thing essentially ugly in great breadth, or in a circular heading to an aperture for the admission of light, but because we know that no private house in Edinburgh has a chamber of such dimensions as to require so large a window for the due admission of light, and because we see the confession of this, in that two-thirds of the pretentious window are built up in the inside.

It follows, I think, from this fundamental principle of suitableness, that the architecture of one age and one country, however perfect in its own time and place, is not necessarily good, and is probably bad, when transferred to a different climate, and to an age in which the social habits have materially altered. The purpose of a picture or a statue is to be looked at, and if it give pleasure to those who look at it, it fulfils its purpose. But the case is very different with a building. Its primary purpose is to protect human beings from the weather. In one country, the weather to be principally guarded against is the glare and heat of a tropical sun, in another country, it is the frost and snow of a northern winter. In both cases, common sense dictates, that the principal attention of the architect should be directed to counteract the more pressing inconvenience; that the Neapolitan villa should be cool and airy, that the Scotch country house should be open to the sun and sheltered from the wind. But while such provisions for coolness or for warmth may be sufficient for the production of a comfortable house, they are not sufficient for the production of a fine building; and if by the exercise of a perverted

ingenuity, the architect contrives to give a southern character to a building essentially northern, he sins against truth and nature, and common sense and good taste.

The fame of the imperial embellishments of Paris, and particularly of the new Rue de Rivoli, led me, in the early part of last summer, to cross the channel, and to spend a week in the contemplation of works, which, whatever be their merits or demerits, would afford matter for much longer observation to a much more intelligent observer than I am. I returned, however, with certain recollections and impressions, which I have thought it worth while to commit to paper, and which, if the Institute has no more important matter before it, may be permitted to occupy your attention for a portion of the evening.

It was more than twenty years since I had before visited Paris, and the interval was too long to allow my first feelings to be those of contrast between what I saw and what I remembered — for in fact I remembered very little. My first feeling was not of admiration so much as of wonder, at the extent and multiplicity of the works in progress. A handsome street of some three miles in length, more than half completed, and nearly one side of that half occupied by palaces, new or restored; large square spaces in every quarter of the city, strewed with the materials of condemned houses, scaffolding for the repairs of every ancient church and monument, sculptors, painters, and artistic glaziers every where at work, form altogether a scene of which it is difficult to imagine either the means or the end. Such scenes in this country would lead to the notion, that speculation had run mad; but having nothing to do with French politics, I did not trouble myself about expenses and returns, but employed my short holiday in general observation and occasional criticism.

I must take for granted, that most of those present have seen the Rue de Rivoli, and none, I think, can have seen it without feeling that it has a grand metropolitan air. A street of apparently substantial freestone houses, of considerable breadth, probably about the breadth of our Great King Street, extending, or in progress of being extended, the whole diameter of Paris, about three miles; lined on one side, for nearly a mile, by public gardens and palaces, the Tuileries, the Louvre, and the Hotel de Ville. All this extent of design and magnificence of accompanying decoration, forms a very striking picture — one to which in this country we have nothing to compare. But when the length of the Rue de Rivoli is brought forward as its principal merit, I must say, that any pleasure which I enjoyed from the view, was in no degree owing to that consideration. There does exist a proper definite proportion between the breadth of a street and the height of the houses of which it is composed, for that determines the point of view; but there is no such reason determining the proper length to which the street ought to be continued in an inflexible straight line. And there are, I think, reasons why the straight line, without any gradual curvature or any interrupting object, should not be so very far extended. While no pleasure is caused by seeing an indefinite number of similar houses gradually subtending diminished angles, and converging to a point in the distant horizon, like the elementary diagrams in a treatise on perspective, the mind is wearied by the prolonged recurrence of the same forms, and the observer stops short long before he has got to the end of the street, in the persuasion that he would get no new idea by proceeding farther. As to the forms so repeated in the Rue de Rivoli, there is little to be said either in the way of praise or blame. The ground

floor is very plainly arcaded, and the depth of the covered space, being but the breadth of the ordinary trottoir, is rather shallow. The windows are well arranged with very slight mouldings and architraves, and the roof, of zinc I think, is somewhat obtrusive. It will be seen, then, that the wall face presents nothing to concentrate the attention upon particular features, and that looking only to the north side of the street, the Rue de Rivoli is merely a wide handsome street of preternatural length.

But the case is very different with the other side, where we pass in succession the formal gardens of the Tuileries, which, from their formality, have something of an architectural character; then the flank of the Tuileries, of which we have seen the garden front as we advanced; then the new line of gallery facing the old gallery of the Louvre, and then the Louvre itself. This great series of connected buildings, all of palatial character, now stands clear of any buildings of inferior or dissimilar character, covering a space considerably exceeding our three Queen Street Gardens, especially in breadth, with each of its four façades finished in all the minuteness of their decoration, and well exposed to observation, except perhaps the side running along the Rue de Rivoli, for the street is hardly wide enough to afford a good point of view. No one, I think, can look at this gorgeous combination of palaces for the first time, without very strong feelings of pleasure and admiration. They speak for themselves, that they are the work of a nation possessing hereditary greatness, and a continuously developed civilization; and when a Briton sees a Napoleon the Third completing and harmonizing the great works constructed in the times of the Valois and earlier Bourbons, he must feel, that in whatever revolutions France may revolve, there is in her an unseen central point of unity, coherence, and progress;

and the visible mark and symbol thereof, is the now continuous palace of the Louvre and Tuileries.

But it will be readily understood, that such a mass of building may be beautiful and imposing, while its several parts are very far from being satisfactory. The parts which date from the reign of Francis I. and Charles IX. are in the French Renaissance style, that is to say, the wall face is covered with a profusion of pilasters, festoons, tympana, round or pointed, the details being all, in some degree, imitations of Greek or rather Roman models. That this is a bad style, is I believe generally admitted. The study of the architect has been devoted, and the attention of the spectator who wishes to appreciate the real merit of the work is directed, not to bold forms, breadth of effect, and the exponents of structural skill, but to the beauty of minute detail — in fact, to the ornaments of the building rather than to the building itself. In the pavilions, as the French call them, that is, the most elevated portion of the façade, at the centre or the extremities, the roof is carried up to an extravagant height, and generally in the ugliest form, that of a truncated pyramid. Out of the sides of these pyramids protrude tall chimney stalks, reminding one, inevitably, of asses ears; and these chimneys are as elaborately carved, as if they were the crowning beauty of the whole concern. Still, as the whole of the long front of the Tuileries, and all the Louvre, with the exception of the south and east external fronts, are in this debased style, the architects employed on the recent continuations have properly, and almost of necessity, employed the same style. The southern and eastern façades of the Louvre are of very good Roman Architecture, especially the eastern, a fine colonnade of Corinthian pillars in couples, on a well proportioned basement. The only fault is in the centre compartment, which

exhibits the folly of a false gable, and is loaded with trifling divisions and unnecessary ornamentation. This, however, is one of the finest monuments of the age of Louis XIV., and with such an example next door to us, it is strange and lamentable, that we could get nothing better for our money than our National Gallery in Trafalgar Square.

Upon the whole then, gentlemen, I would say, that the walk from the Champs Elysées to the Hotel de Ville, presents a series of architectural objects of great interest; so far as I can judge from pictures, for I have visited none of the other great European capitals, of greater interest than can be elsewhere found. But as a study for the young architect, who wishes to form his taste by the contemplation of good models, and who looks forward in hope of adding something to the beauty and splendour of our own cities, I would say, that a better lesson may be learned from Pall Mall and New Cannon Street, than from all the glories of the Rue de Rivoli. Paris, like Edinburgh, is so well supplied with good stone, that at no period do the French architects appear to have thought of using any other material. It is a misfortune, that the English architects, working where stone was scarce or bad, should have preferred to imitate stone by miserable compositions, in many cases little better than a layer of brown paper, rather than by studying the capabilities of well-formed, well-coloured, and well-burned bricks. The London architects are now showing a better feeling, and the hall and library of Lincoln's Inn, the line of warehouses in Cannon Street, the large blocks of building at the corners of Chancery Lane, and of Norfolk Street, Strand, show that our architects are beginning to know the value of brick.

The restoration of ancient buildings in France is proceeding at an equal pace with the erection of new streets

and palaces. Everywhere, not in Paris only, but in the provinces also, I found the old churches blocked up by scaffoldings, and occupied, almost to the exclusion both of priest and people, by artists and artizans, engaged in the work of restoration. The most celebrated perhaps of these restored edifices, is the Sainte Chapelle, a very beautiful specimen of what we call the Geometrical Decorated, and dating, I think, from about the middle of the thirteenth century. It is a small building, not larger I should suppose than Henry the Seventh's Chapel at Westminster; and my special purpose in visiting it, was, that I might form some judgment of the effect of that polychrome ornamentation of pointed architecture, which is becoming popular in England, but has nowhere been applied with such splendour and profusion, as in the restoration of the Sainte Chapelle. It must be remembered, that this building has a much larger proportion of window than is usual in buildings of the same date and style in this country; that all the windows are filled with richly stained glass; and that the narrow portions of wall between the windows, are principally composed, in their internal face, of the shafts supporting the ribs of the vaulting. All these are painted, in rivalry with the glowing windows, of the deepest primary colours, red, blue, and gold, so that, so far as I remember, there is hardly a square foot of any neutral tint to be seen throughout the whole interior. Now the result on my mind, was a conviction, that all this high painting had better have been left undone, and a hope that such ornamentation, to such an extent at least, may not be introduced into our English Cathedrals.

It may indeed be allowed, that high colouring is naturally pleasing to most eyes; but it is most pleasing to those whose habits are most exclusively sensuous, to savages

and to children. The more sources of pleasure we can combine in the same object the better; but then it is necessary that we should really *combine* them; and it is not for the better, when the inferior source of pleasure, namely Colour, is permitted to interfere with the higher, namely—Form and Adaptation to purpose. If indeed there be any one who can say with truth, that painting, not in its artistic sense, as the exponent of poetic sentiment, but merely as an harmonious arrangement of colour; that a pretty French stained paper for instance, is to his mind as powerful a source of pleasure, as the forms and proportions of a first-class building, I should consider his æsthetic sensibilities as on a par with those of Mr. Lumkin, whose Cynosure was blessed with eyes like sloes and cheeks like a pulpit cushion. But as the preference, in cultivated minds, is generally the other way; as it is generally allowed that Form is the essential quality both of Sculpture and of Architecture, we must conclude, that painting is admissible in either art, only so far as it does not interfere with the perception of form.

It would be out of place here to enter upon the vexed question of the colouring of statues. On that head, I will only say, that the Nineveh Sculptures, painted as they are in the Crystal Palace, appear to me to have lost all their severe grandeur, and to be as works of art, nearly on a level with the Benbows and Nelsons, at the heads of our seventy-fours. But in reference to architecture, and if there be any truth in the foregoing principle, then it must follow, that the walls of our Cathedrals ought to be painted only in such a way, and to such a degree, as may neither destroy the perception of form, nor materially withdraw the attention from it.

The painting of the Sainte Chapelle is not objectionable under the first of these heads; for the lines of colour follow

very exactly the lines of form, and so far the decoration is judiciously managed. Whether it offends under the second head, whether it withdraws the attention from the lines of form, is a matter which each observer must determine for himself, and from his own experience and recollection. I must say, that it did so withdraw my attention; and the proof to me that such had been the case, was, that after a few days, my recollection of the painting was much more vivid than of the architecture. It is, I think, in diminishing the effect of the mouldings that this is particularly felt. The depth of the hollows and the relief of the salient parts as they really exist, and as they were intended by the architect to appear; or in other words, the true light and shadow produced by the undulation of the surface, is far better perceived, when all parts are of the same colour, and that neutral, than when the different portions are, either really or apparently, of different and differently coloured materials.

These objections to high colouring do not apply to frescoes on smooth surfaces, whether flat or curved, nor to the admission of stained windows. Indeed, the tracery of a large pointed window is better seen and appreciated, when the glazing is of coloured than when it is of raw glass. In the latter case, the contrast between the stone work and the lights is so strong, that the tracery is seen merely as a Silhouette, or black profile on a white ground; and the eye, blinded by excess of light, knows nothing of the sections of the mullions, which might be simple circles or squares, for any thing which the observer sees to the contrary. But in reference even to windows, I think that the principle I have been advocating, the adaptation of the lines of colour to the lines of form, ought not to be neglected. In the fine series of windows in King's College, Cambridge, the

designs are such as would suit a large canvass of the size of the window. In consequence, the pictorial and the architectural lines perpetually interfere with one another. A transom crushes the head of an apostle; a mullion amputates an extended hand or annihilates a foreshortened leg. I have been alarmed by some reports which have reached me, respecting the projected glazing of the windows of Glasgow Cathedral, which have led me to suspect there exists a wish to adopt designs having the same want of adaptation to their position, as offends the judgment in the windows at Cambridge. I sincerely hope that the final decision may be very different.

The only important buildings which I visited out of Paris, were the Cathedrals of Chartres and Amiens. Amiens, on the high road to Paris from London, is visited by every traveller, and its beauties are chronicled in all the guide books. Little then need be said of it, and I hope I shall not be thought insensible to its great merits, if I suggest that there is a want of proportion between its height and its length, that it is either too long for its height or too high for its length. The guide books give the height from the floor to the pitch of the internal roof at 140 feet, while the length is only 400 feet, less than thrice the height; while York, the highest I believe of our English Cathedrals, is only 100 in height to 500 in length. I have no doubt, that the very different proportion to which we are accustomed has some effect in rendering the proportion of Amiens unsatisfactory, and that to some extent the objection arises from prejudice. But there is more in it than this. The great height of Amiens is due to the height of the piers, separating the centre nave from the side aisles, while the triforium and clerestory come nearer to our familiar proportions. The result is, that the architecture of these latter

portions, and *a fortiori*, the groining of the roof, cannot be studied without much discomfort, that painful throwing back of the head, to which we are driven, when we wish to study a tower, without being able to retire to a sufficient distance from its base. In viewing the Cathedral of Amiens from the exterior, and especially when considering it as a portion of the general landscape, the comparative shortness is very striking, and combined with the irregular and imperfect terminations of the western towers, suggests the idea of a merely rudimentary church; and the same defects are found in many others of the French Cathedrals.

Chartres is distant from Paris fifty-five miles, and its Cathedral would well repay a longer journey. The railway is conveniently timed both for going and returning; and those who can spare a day from Paris, cannot employ it better than in visiting this noble structure, which stands well exposed on the crest of a wooded bank, rising from the river Eure. The two spires which flank the very plain west front are very lofty, and both good, though of very different style and date. But the most beautiful exterior features, are the portals of the transepts, of a size, depth, and richness of ornamentation, of which we have no examples at home; and which, I believe, have no rivals in France, except the more celebrated portals in the west front of Rheims. It is not probable, that in this age and country, any architect will ever be called upon to produce a work of such magnitude and richness; but I think, that a familiarity with the transept portals of Chartres, would lead our architects to attempt some bolder effects of light and shadow than appear in any of our modern pointed structures.

The internal glories of Chartres are, the sculptured stone screen behind the high altar, and the complete series of coloured windows. The screen, extending to considerable

length round the apse, and down the sides of the choir, is architecturally uniform; but having been gradually completed during the course of the sixteenth and seventeenth centuries, there is considerable difference of style and execution in its different parts. It is to be observed, that I am speaking of what we should call the back of the screen, its convex face towards the side aisles, a part which, in most churches, is treated as being out of sight, and is consequently left without any attempt at ornamentation. Whether it was judicious to expend so much labour and expense upon a portion of the building, somewhat withdrawn from observation, may be questioned. Still, the polygonal termination of the French churches, and the consequent open space, generally flanked on the outer side by a series of highly decorated chapels, renders it almost necessary that the inner side, that is to say, the back of the reredos or altar screen, should not be entirely neglected. The sculptures on the Chartres screen appeared to me curious, as illustrating the gradual encroachment of Renaissance upon mediæval principles of art; but that is a subject upon which I feel myself unqualified to speak.

But the crowning beauty of Chartres is its series of windows. How these have escaped through the civil wars, when the Huguenots destroyed whatever they considered as idolatrous; and through the revolutionary riots, directed generally against whatever was old, and specially against all that was religious, I cannot imagine. However, there the windows stand in all their original completeness and beauty. I must own, that my recollection of the designs is very imperfect, and I do not consider that this is to the discredit either of the windows or of myself. I think that the definite pictures are small, inserted as medallions, and surrounded by a much larger space of mosaic, where the colours

are harmoniously and symmetrically arranged, and especially when the sun is upon them, glow with an intensity which I never saw in any others. I observed, that the pieces of the mosaic work were small, much smaller than in our new windows; and the guide books say that the glass employed is half an inch thick. I should have considered this last assertion as very incredible, had I not heard the same measure given by a very intelligent young man, who, from his education and special employment, was not likely to speak at random. This gentleman, to whom I was introduced at the inn as a compatriot, turned out to be a Mr. Laing, who, after passing through Heriot's Hospital, and having studied in some architect's office in Edinburgh, was, when I met him, residing at Chartres, employed by Mr. Ruskin in making large drawings of the architectural ornaments and sculptures of the Cathedral. Though I have little liking for Mr. Ruskin's dogmas, I know that he is a very clever draughtsman; and to be so employed by him is strong testimony to Mr. Laing's merit. Shortly after my return to Edinburgh, I was shown at Heriot's Hospital a Record Book, the title page of which was ornamented down the margin by very neat vignettes, giving different views and portions of that honoured edifice. I was informed these had been executed by a pupil in the house, and that pupil was my friend at Chartres.

And now, gentlemen, I fear you may think I have travelled to small purpose; but I have told you, to the best of my power, what I saw in France, and what I thought of what I saw.

Transactions of the Architectural Institute of Scotland,
Session, 1856-57.

No. II.

ON CHURCH TOWERS.

BY

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ADVOCATE.

[*Read at a Meeting of the Institute, held in Glasgow on 25th February* 1857.]

There is nothing perhaps which more attracts the notice of a traveller south of the Tweed, than the steeple of the frequently recurring parish church. Of the numerous churches in England, built in the Gothic, or as it may almost be called, the native style of architecture, few are without a tower or spire. In Scotland, there are few to which the belfry does not still supply the place of a tower or spire. In the following remarks on Church Towers and Steeples, I do not propose to refer to the cathedrals and first-class churches of either England or Scotland, monuments to this day of the taste and constructive skill of their architects, but to the parish and other churches.

The first towers in connection with Christian churches appear to have been the Italian Campaniles. Usually quadrilateral, tall and perpendicular, they were built generally detached from, sometimes touching an angle of the church, or basilica to which they belonged. As their name implies, they were bell towers, and in time of war or civil disorder, also watch towers or observatories. They were solid below,

having round-headed windows in the upper stories, variously arranged in different examples, with roofs horizontal or pyramidal. In later times, the campanile, retaining its leading characteristics, came to be more ornamented in its details, and had often at the top a lantern or some other decoration.

Christianity proceeding northwards from Italy, the architects on this side the Alps took the first type of their churches from that country, and borrowed also the tower. They appear to have very soon introduced an important change in the disposition of the building. Instead of being detached as in Italy, the tower, still built from its own foundation, was made, in the general case, an integral part of the church plan.

This modification of the plan of the Romanesque church and campanile has always been a distinguishing feature of northern church architecture, though it may with some ground be maintained, that it was not adopted by the Celtic tribes in their first Christian churches; as evidenced by the well-known round towers in Ireland, and the two Pictish towers of Abernethy and Brechin, in Scotland. Whence the design of these towers was derived, is still a matter of doubt; but that they originally belonged to Christian churches, either detached, as in Italy, or joined in some way to the building, can hardly admit of question. Indeed, they are now all but ascertained to have been built in connexion with Christian places of worship, between the sixth and thirteenth centuries, as places of strength and symbols of power, and to have been used as bell towers, and as keeps or fortalices, to which valuables might be conveyed for preservation, in time of danger or sudden attack.*

* See "Petrie's Inquiry into the Origin and Uses of the Round Towers of Ireland," 1845.

Although the early church towers, to the north of the Alps, were probably built stronger, and of more enduring materials than the rest of the building, it cannot be expected that many should remain to the present day. At Puissalicon, near Beziers, in the south of France, there still stands an early tower among the ruins of the church once attached to it, in style resembling the towers of Italy more than any found farther north. A very old church and tower at Querqueville, near Cherbourg, on the coast of Brittany, may also be referred to, as showing the northern progress of the church tower. It is described as "rude and simple in its outline and ornaments, built with that curious herring-bone or diagonal masonry, indicative of great age, and differing in every essential respect from the works of the Normans, when they came into possession of the province."*

The tall square tower of St. Regulus, at St. Andrews, is another example of a Romanesque church tower. It has in the upper story a double-light round-headed window, divided by a baluster.

In the same class of early towers, but deriving from Italy through Germany and Belgium, may be set down the English Church Towers, described in the fifth edition of Rickman as Anglo-Saxon.† They bear externally a certain Romanesque character, though rude in design and construction, and showing the admixture of a Gothic element. Modern civilization having as yet scarcely begun, the only light by which those early architects could have been guided, was the reminiscence of the Roman architecture, coupled with the practical views of church building, introduced by the progress of Christianity — a progress which, in Western Europe, referred back to Italy.

* Fergusson's Handbook of Architecture, pp. 608, 643.

† P. 55, and Appendix.

Of the Gothic races of church builders, that with which, nationally, we have most concern, is the Norman. While the Saxon work was rude and plain, the work of the Normans showed itself, soon after their settlement in France and in England, to be of a more elaborate and architectural character.

The Normans, originally a predatory and always a warlike race, proceeding southwards from Scandinavia, in the tenth century, established themselves in the north of France, and in the eleventh century, in England, at the Conquest. They adopted in France the Romanesque style of architecture which they found there; introducing however various modifications, which serve to distinguish the Norman style from the Romanesque or Lombard. The Norman churches, large as well as small, were severe and massive in their style, and remarkable for strength of construction. The plan of their first churches, was an adaptation of the Basilica, and consisted of a nave with a semicircular apse, forming the choir. The larger churches began very soon to be built in the form of a Latin cross, with transepts and side aisles. The Normans first introduced in France the central tower, at the intersection of the nave and transepts, in their larger ecclesiastical buildings. In their smaller churches they continued to place the tower at the west end.

In England, the Normans built rapidly after the Conquest; the Anglo-Norman period of building extending from 1066 to nearly the end of the twelfth century. Some of the parish churches and abbeys then built still remain in whole or in part. The roofs were mostly vaulted. The arches and the tops of the doors and windows were, generally speaking, semicircular, though the occasional intersection of the arches and the manner of cross-vaulting are thought by some to show in Norman work the germs of the Pointed style. The

pillars were short and massive, their capitals having usually a square abacus. The walls were strong and thick, being usually faced on each side with flat stones, and the hollow space between filled with "grout work," that is, small stones conglomerated with hot cement.

The Anglo-Norman towers were built from the ground, broader and lower than the earlier towers, seldom rising more than a square in height above the roof of the building to which they belonged. The walls, like those of the main building, were of great strength of material and construction. They frequently had buttresses at the corners, a stone staircase being sometimes carried up within a projecting turret, attached to one of the angles. The towers were occasionally, though rarely, circular instead of square, as that of Little Saxham Church, and other church towers in the county of Suffolk, which still remain. The towers were either plain externally, or ornamented with surface arches occasionally intersecting. A narrow single-light slit, or window, was placed in the lower story, while the upper or belfry story had usually double-light round-headed windows, rather broad in proportion to their size. The walls of the tower terminated horizontally, or with a more or less pyramidal roof. Along the summit of the walls was carried a parapet or machicolated battlement.

Having regard to the characteristic features of the Norman Churches, the severe simplicity of their style, the great solidity of their construction, and especially the strengthening and embattling of the towers, the observation occurs, that this marked change and modification on the Romanesque and Lombard style was not made by the Normans without a purpose. In their territorial arrangements, they are considered by historians to have displayed sagacity and military foresight; and when they built churches like small fortalices,

it appears very probable that they intended them actually to be such. In England, the Normans had at first to maintain their ground, with a comparatively small force, against the numerous though less warlike Saxon population; and it may well be supposed, that whatever they set themselves to build, whether castle, town or church, would have some view to security. Thus, with them, a strong church tower would not be a piece of architecture merely, but a stay and defence. When the country became settled, and the new race amalgamated with the Anglo-Saxon population, we shall find the church tower gradually assuming a less warlike and massive character; though many country churches in England continue, to this day, examples of the strong, characteristic and enduring, albeit plain and ungraceful Norman style.

This theory, accounting for certain distinctive features of the Anglo-Norman style of church building, particularly as regards the tower, is so far confirmed, by referring to the fortress-like aspect of some early churches, built in what may be considered similar circumstances — that is, when the times were unsettled, and the country in which the churches were built, was occupied by conflicting races. In Spain, where the Christians maintained a continual contest with the Saracens and Moors, from the eighth to the fifteenth century, gradually gaining ground in a southerly direction, till the final conquest of Granada in 1492, the more ancient churches, in many parts of the country, resemble externally small fortified places rather than sanctuaries for worship. This I had an opportunity of personally remarking in the course of a visit to the central and north-eastern provinces of Spain, during the autumn of 1853. Of the churches which came under observation, very many, both in the rural districts and in towns, had a sombre look, from the heaviness

of their architecture, which was for the most part Gothic, and the paucity and smallness of their windows. Some, by reason of their solid construction, embattled walls and towers, would have been taken for prisons or fortified places, had they not been known to be churches. Thus at Avila, an old Castilian town, between Madrid and Salamanca, the Cathedral Church is of massive build, embattled like a fortress, with a strong square tower and a higher tower for the bells. The old Cathedral at Salamanca is also massive and plain in its architecture, externally half-church half-fortress. At Valladolid and Burgos are churches of the same description, one of which had a flag-staff on its tower. In France, likewise, several churches still remain, as to which there can hardly be a doubt that they were originally fortified places.

That the Irish round towers were probably used occasionally as places of defence or security, has been already noticed. The battlemented tower of Jerpoint Abbey, in Ireland, as well as the old church at Cashel, which was consecrated in the year 1134, have as much the aspect of fortresses as of ecclesiastical edifices.

Although in certain particulars which have been referred to, the Norman churches departed from the Romanesque or Lombard style, and assumed a character of their own, yet in one essential feature, the use of the round arch, they adhered to the Italian type. In the end of the twelfth century, about 130 years after the Norman settlement, the round arch in architecture was almost entirely superseded by the pointed. The churches of the Early English period, embracing the thirteenth and fourteenth centuries, built in the Pointed style, assumed with the pointed arch a greater degree of lightness of proportion in all parts of the building.* It is

* While using the Rickman terms to denote the periods of Gothic architecture in Great Britain, I am aware that they are but an approxi-

however to be remarked, that some churches, showing the pointed arch in windows, have very short massive towers and other Anglo-Norman features — rendering it probable that they were originally built in the Anglo-Norman time.

The Early English towers were built higher, and with more variety of design than the Anglo-Norman. The buttresses at the corners, rising from the ground with an increased projection, were either pyramidally capped, or made to terminate in small pinnacles. The pinnacles served the double purpose of giving additional solidity and weight to the buttresses, and to the tower more architectural effect. Of the towers in this style, some are finished at the top with parapets plain or battlemented, while some are surmounted with spires. The exterior of the churches, both in England and Scotland, began then to assume that picturesquely varied outline, and consequent play of light and shade, which in more modern structures we often look for in vain.

The spire seems to have originated in the raising or elevating of the roof of the tower, till it assumed more and more of a pyramidal form. Small pointed gables being built up from the horizontal top of the tower, the roofing in of these would form a steeple; and this sort of spire is still seen in old churches in Britain, and in Germany and Denmark.

In the progress of architectural design and constructive skill, the Gothic spire rose in height, and became what we see

mation to the truth, in so far as the practice of the art was almost always in a state of transition; and in Scotland, the national relations with France and the Low Countries had great influence on the building style, particularly during the Perpendicular period in England, of which style there are hardly any original examples in Scotland.

it in churches of the early English and later periods. It was so much liked in England, that spires were often added afterwards to towers, built originally without them. In country churches of this period, small spires are still to be seen, of a very primitive shape, rising from a base considerably within the square of the top of the tower; but these are not good examples. When there is no parapet, the slope of the spire should go down to the edge of the wall of the tower, and finish there with a tablet. The finest spires, however, were those rising from a parapet, and accompanied by pinnacles at the four angles of the tower, surmounting the buttresses. The steeple of the General Assembly Hall, in Edinburgh, may be referred to as a modern example of a good plain spire of this description, with pinnacles.

The towers and spires built in the fourteenth and fifteenth centuries, do not differ in essential characteristics from the early English steeples. Parapets and battlements continued to be used, the battlements being frequently pierced and ornamented with panel work. The buttresses gradually became a more prominent architectural feature, receiving increased projection and depth, as the walls were made less massive, and requiring more support. Pinnacles were more frequently placed at the angles of the towers, whether square-topped or surmounted by a spire.* In the larger church steeples, windows with varied tracery were introduced — a very beautiful feature, unknown in the earlier Gothic.

In some steeples now remaining, the tower part is of early English work, and the spire of subsequent date. Indeed,

* Besides being used as bell and clock towers, church steeples had frequently at the top a weathercock, to show how the wind blew. Thus, in Shakespeare, Lear addresses the storm —

> "You cataracts and hurricanoes, spout
> Till you have drenched our steeples, drown'd the cocks."

most old churches show the styles curiously mixed; being altered more or less, since their first building, by later additions and arrangements and inserted windows. Of Norman work, the semicircular doors were most favourably regarded by architects, and were often allowed to remain, as may be seen at the present day, when the rest of the building was restored in the Pointed style. Up to the close of the Gothic period in England, restorations and additions appear to have been made, as a general rule, in the current style of the day, whether Early English, Decorated, or Perpendicular, the builders of those days never going back on their steps, but using the newest modes, without much regard to consistency. As is naturally to be expected, the greatest number of ecclesiastical buildings, perfect in one style, are in the latest Gothic which prevailed in England and Scotland—in England, the Perpendicular, in Scotland, a style more resembling the French Flamboyant.

About the end of the fifteenth century, Gothic architecture was declining, both in purity of style and execution. The Palladian Architecture, or by whatever other name the modern Italian adaptations of the classical style may be called, was introduced into Great Britain in the sixteenth century; and without at first finding much expression in ecclesiastical edifices, was adopted in the building of palatial mansions. In the reign of Charles the Second, however, the Great Fire of London, by which so many churches were burnt down, gave an occasion for fairly trying the new style in church architecture. St. Paul's Cathedral was rebuilt in the Italian style; and in this great work, Sir Christopher Wren may be said to have shown as much mastery of it as was possible in an English building.

Whether it is that the majestic dome and a grand scale of columnar arrangement be necessary to the perfection of

the modern classical style in ecclesiastical building, or that architects have been unable to make a successful application of it to smaller churches, it is certain, that with few exceptions, the lesser churches built in this style, up to the present time, are far from satisfactory in an architectural point of view. In this observation, however, as to the lesser churches, I would not include the churches in the earlier Romanesque or Lombard style, and its adaptations, of which there are many examples in Italy and on the continent, though few in this country.

It is not my purpose to enter on the question as to the comparative merits of the Classical and Gothic styles, as applied to church building. I cannot help thinking, however, that an architect having chosen his style for a church should keep within it; and I would just approach the territory of the classical style for the purpose of reclaiming what appears to have been appropriated by mistake. Not satisfied with the Italian campanile, the architects in this style have adopted the Gothic steeple, when it pleased them so to do, applying to it Italian details. But the Gothic steeple is, both in form and feeling, a proper feature of Gothic Architecture. Its original type (as we have seen) may have been Italian, but by long use and wont it has been made part and parcel of the Gothic style, growing with its growth, and strengthening with its strength. Sir Christopher Wren, in the smaller churches built by him in London, set the example, in this country, of Italianizing the steeple — an example which one cannot but regret has been so much followed. Architects are so accustomed to look to what is called *effect*, that (I may be pardoned for saying) they sometimes forget consistency.

The campanile, as we see it in Italy, particularly in Lombardy and the north of Italy, is a fine and graceful

architectural object, when well built and suitably placed. It would seem architecturally to be more in keeping with a church in the early Romanesque style, than with a Renaissance church. Appropriately placed and not joined with discordant buildings or scenery, there is nothing in the campanile, regarded as a bell or clock tower, unsuitable to our country or climate. It might have more or less surface ornament, and be with or without a lantern. It need not be detached from the church to which it belongs, although it no doubt is so in most of the older examples. A Romanesque church, handsome, but too gorgeous for imitation, has been recently built by Mr. Sidney Herbert, at Wilton in Wiltshire, where the campanile appears detached from the church, though connected with it by a low corridor, at right angles to one of the sides. This was matter of choice; and one may refer to churches in the north of Italy, existing at the present day, which are obvious to every traveller, where the campanile is part of the church building. As the tower of a church in the Romanesque and round arched style, the campanile, I venture to think, would be a much less objectionable bell and clock tower, than the anomaly we occasionally see, of a Gothic steeple, covered with Italian ornaments, perched upon a hulky church, with a portico calling itself Greek.

With every wish that the campanile should be tried with us under favourable circumstances, whether in a town situation or in cultivated landscape scenery, like the upper Vale of Clyde, one can hardly be wrong in giving the preference to the Gothic tower and spire, in most situations where a church is to be built in Scotland in the Gothic style. Whether it should be Norman, Early English, Decorated (of which there are some good Scottish examples), or Perpendicular, is a question depending on the taste of

the person building the church, on the situation, and on the funds which the architect can count upon. A small church with a belfry, built in a good though unpretending Gothic manner, is better than a church resembling a barn; but still better than either, is a well built church with a tower or spire, which gives an effective character to the building, and admits of both a clock and a bell. Even in country situations, the low Norman tower is what few people now would much affect; besides, that Norman work is said to be more difficult to imitate than would at first sight be supposed. The Early English tower, with proportions tending rather towards the later styles than towards the Norman, seems to be well adapted for country churches which are to have a tower; and for such churches, when expense is a matter to be considered, this is probably the style which would be found most suitable.

In a valley or flat situation, it may be desirable to surmount the tower with a spire, well proportioned however, and neither stunted nor needle shaped. For a church on a height, a tower might be preferable. I have occasionally seen in country churches in Scotland, small meagre spires, rising from a gable or some part of the roof of the church, with very poor effect. If a spire is not to be perfectly satisfactory, raised from a tower as its base, a plain tower is better in any situation.

The position of the tower or steeple raises the question of the shape of the church. For a large church, a central tower, at the intersection of the nave and transepts, may be the best. For a small church, that the tower should be at one end, attached to or built in to the gable at the middle, or at one of the corners, is perhaps the preferable arrangement. In Roman Catholic times, churches were built east and west, and the altar being at the east end, the

tower in small churches was at the west end. Hence, in the vocabulary of Gothic Architecture, a "western tower" has, by long use, become almost a household word. But although it may be one of those customs, derived from the early practice of Christian churches, which there is no harm in adhering to, if the site of the church admits, it would seem to be a matter of little consequence, even in the case of Episcopalian churches, and still less in the case of Presbyterian churches, at which end of the church the tower should be placed. When the church has transepts, the tower is sometimes built into one of the transepts. For a church of moderate dimensions, when the object is to obtain a commodious place of worship, it is thought better to avoid the cross form and have no transept.

Mr. Beckett Denison, in his little book on Gothic Architecture, published to promote the subscription for the rebuilding of St. George's church at Doncaster, while recommending the adoption of the plan of a central tower for that large church, makes the following observation, in which I entirely concur — "No doubt a west end or transept tower is, for some purposes, more convenient than a central one, especially where a central one would contract the nave to a mere narrow passage through the arch; and accordingly, in small churches, or in churches where they want as much space as possible for a small sum of money, I think a central tower is a mistake; and it generally looks like an ambitious attempt to copy a large plan on a small scale, which is always a failure, either in an entire building or its details, especially in windows, though many modern architects seem to think otherwise, and have got into the habit of making up little churches for 500 people, of as many separate parts, and with as many different roofs, as

a cathedral; and parsonage houses in the same way, with nothing but ins and outs, and ups and downs," &c.

Such a state of matters — objectionable as applying the plan of a large cross church, with transepts and clerestory, to a church of limited dimensions, and causing too many angular spaces — would be avoided by making the church oblong, consisting of a nave with or without side aisles, the tower at one end, an apse or chancel at the other end, and a porch, if thought proper, at the side; the entrance being either at the tower end, or by a south-side porch door only, which, in exposed situations, would contribute to the warmth of the church.

Where the architect is not restrained by his employers, counting the cost somewhat narrowly before they build their tower, the later styles of Gothic architecture may be preferable, as giving more scope for skill and architectural design in varying the form and arrangement of the subordinate parts of the church and steeple, such as buttresses and pinnacles, and particularly as allowing the use of traceried windows — one of the most beautiful and characteristic features of Pointed Architecture. To enter upon this subject, however, or into the important question — how best to adapt architectural forms to the requirements of Protestant places of worship, whether Presbyterian or Episcopalian, would be going beyond the limits of these observations.

Transactions of the Architectural Institute of Scotland,
Session 1856–57.

No. III.

ON THE

STRUCTURE AND GROWTH OF TIMBER,

AND ON

DRY ROT IN WOOD.

BY

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In an architectural point of view, wood is a material of vast importance, whether we regard utility or ornament. The durability and the comfort of buildings depend much on the condition of the timber employed in their formation. In this country, where stone and brick are so abundantly used in the construction of houses, wood is employed chiefly in the fitting up of the interior. Although it is thus not exposed to the vicissitudes of the weather, still it is liable to accidents and changes of various kinds, which it becomes the duty of the architect to guard against as far as lies within his power.

In Naval Architecture, the quality of timber is all-important. A first-rate man-of-war is composed of about 3000 loads of timber, the average growth of 40 acres in one hundred years. There have been sad instances of first-rate

ships having been paid off in two or three years after being launched, owing to the decay of the wood.

Kreuter, in his report of the forest economy of the Paris Exhibition of 1855, remarks—France requires annually for the imperial navy, 1,120,000 cubic feet of oak timber, and 1,400,000 cubic feet for her commercial navy; total 2,520,000 cubic feet. Britain requires five times as much, and America requires more than Europe. The timber consumed in Railways is enormous. A sleeper measures 3 cubic feet, and one mile of single rails requires 8000 sleepers. They last on an average five years, therefore 1600 require changing annually, that is, for 100 miles 160,000.

There are various causes of destruction in timber, more particularly when it is exposed to changes of weather and to moisture. Alteration in the cells and vessels of the wood, and attacks of fungi and of insects, are fertile causes of decay.

We shall, in the first place, examine the structure of woody stems, and then consider the alterations which they undergo in the progress of decay. The trunks of exogenous trees will chiefly demand our attention, as they furnish the timber with which we are most familiar. The stems of endogenous trees, such as those of Palms, are rarely used, except as articles of furniture;* while acrogenous stems, as those of Tree-ferns, are scarcely ever employed for any important economical purpose.

In the trees of this country, the growth of the wood proceeds in an outward direction, new layers being superimposed on those previously formed. Thus year after year,

* Veneers are made of the timber of *Copernicia cerifera*, one of the wax Palms, the trunks of which are sometimes imported into Britain. Fine specimens are to be seen in the Museum at the Edinburgh Botanic Garden.

additional zones or circles of wood are produced on the outside. Hence the trees are called exogenous or outside-growers. The sap-wood, softer wood, or alburnum, is in the exterior part of the trunk, while the hard wood or duramen is in the interior. The stem is composed of cellular tissue, which is seen in the pith, medullary rays, and outer bark, and of fusiform or spindle-shaped woody tubes, spiral, dotted, and other vessels, which together constitute the proper timber of the tree. The woody tubes or fibres overlap each other, and give firmness and tenacity to the stem. They are at first pervious to fluids, but become more or less completely filled up with cellulose or lignin. In the case of Palms, the cells and vessels are differently distributed. There is no pith nor medullary rays, no separable bark, and no concentric circles. The woody fibres are produced within those previously formed, and hence the trees are called endogenous or inside-growers. The hardest part of the Palm stem is on the outside, and this sometimes becomes so hard as to resist the blow of a hatchet. The outer part of a Palm stem, is that which furnishes the most durable timber. In old Palms, however, the central part becomes also very firm, and hence the entire trunk may sometimes be used for economical purposes.

The stems of Tree-ferns, although durable, want the firmness and solidity of those kind of stems which have been already noticed. The woody fibres in them are arranged in a peculiar tortuous or zig-zag manner, and the stem is usually hollow. The stem is made up chiefly of the united bases of the leaves or fronds, and the growth is at the top. Hence they are acrogenous or summit-growers. The stems of ferns are said to resist well the action of water. They may therefore be employed in somes cases, where other kinds of timber would be liable to rapid decay.

In our future remarks, we shall confine our attention to the exogenous trees ordinarily used for timber in this country. It is obvious, that abundance of cellular tissue and of sap-wood renders the stem more liable to chemical changes, and to decay of various kinds, owing to the quantity of fluid present. The greater the amount of heart-wood, the more completely the tubes are filled up with ligneous or woody matter deposited in their interior, and the denser the lignin is, so much the more durable will the trunk be. The ligneous matter, when it becomes dense, often changes colour, as is well seen in the case of Ebony, which is the heartwood of the tree. Many trees, from the closeness and solidity of the fibres, are well-fitted for resisting decay. This is seen in well grown Oak, in the Teak of India *(Tectona grandis)*, the Teak of Africa *(Oldfieldia africana)*, Mahogany, the Greenheart-tree *(Nectandra Rodiæi)*, and the Mora timber *(Mora excelsa)*. These durable woods are particularly valuable in ship-building. One of these, the Mora wood, is not much known, but it deserves to be particularly noticed. The *Mora excelsa* is a large West Indian timber tree, which is thus described by Schomburgck — "Prominent among the trees which adorn the forests of Guiana, and which astonish by their profuse verdure and gigantic size, stands the majestic Mora, the king of the forest. Rising to the height of from sixty to ninety feet before it gives out branches, it towers over the wall-like vegetation which skirts the banks of the rivers of Guiana, forming a crown of the most splendid foliage, overshadowing numerous minor trees and shrubs, and hung with Lianas in the form of festoons. The Mora, of all other trees of the forests of Guiana, is peculiarly adapted for naval architecture; and it is to be found in such abundance, that if once introduced for building material into the dockyards, there can never be any apprehension there would be a want of that

timber which could not be supplied. The wood is uncommonly close-grained, and gives scarcely room for a nail when driven into it. When cleared of sap, it is durable in any situation, whether in or out of the water. With this property it unites another of equal consideration to builders; it is strong, tough, and not liable to split, has never been known to be subject to dry rot, and is considered, therefore, by the most competent judges, to be superior to Oak and African Teak, and to vie in every respect with Indian Teak. The full grown tree will furnish logs from thirty to forty, or even to fifty feet in length, and from twelve to twenty-four inches square, taken from the main stem, whilst the remaining portions are suited to various purposes of naval architecture; such, for instance, as keels, keelsons, stern-posts, floors, ribs, beams, knees, breasts, backs, &c."* Mr. Bentham, from specimens sent by Schomburgck, published an excellent figure and botanical history of the tree, under the name of *Mora excelsa;* for it had previously no place in botanical works. It belongs to the natural order of *Leguminosæ*, and to the same group or section as the well known *Cassias.* Yet it does not appear that the attention of any of our authorities or travellers has been directed to the commercial importance of this tree till very recently. The same tree has been found to prevail in certain localities of the island of Trinidad.† A large specimen of the Mora timber may be seen in the Museum at the Edinburgh Botanic Garden.

The durability of timber depends, then, on the nature of the ligneous matter deposited in the pleurenchyma or woody fibres; and the heartwood of trees, on account of the lignin in the tubes, is less liable to decay than the alburnum or sap-wood.

* Transactions of the Linnæan Society, vol. xviii. p. 207.

† Hooker's Botanical Journal, March 1855.

Hartig made some experiments on the durability of timber, and he found that small parts of Lime-tree, Black American Birch, Alder, and Trembling Poplar, inserted in the soil, decayed in three years; Common Willow, Horse-Chestnut, and Platanus, in four; Maple, Purple Beech, and Common Birch, in five; Hornbeam, Ash, and Lombardy Poplar, in seven; Robinia, Oak, Scotch Fir, Weymouth Pine, and Spruce Fir, were decayed a little, to the depth of a quarter of an inch, in seven years; while Larch, Common Juniper, Virginian Juniper, and Arbor-vitæ, were not decayed at the end of seven years. Thin boards of the same woods decayed in the following order — Platanus, Horse-Chestnut, Lime-tree, Poplar, Birch, Purple Beech, Hornbeam, Alder, Ash, Maple, Spruce Fir, Scotch Fir, Elm, Weymouth Pine, Robinia, Oak, Larch. From recent observations made by the Duke of Buccleuch at Granton, it would appear that the wood of the Greenheart-tree (*Nectandra Rodiœi*), when exposed to the action of sea water, withstands decay better than other kinds of wood. In making experiments as to the durability of timber for light-house purposes, Mr. Robert Stevenson sunk various kinds of wood into the sea, and he found that Teak was the best for resisting the attacks of the *Limnoria terebrans.*

The following experiments are recorded in the Nautical Magazine, as being made on several kinds of wood. Pieces, $1\frac{1}{2}$ inch square, and 2 feet long, were placed vertically in the ground on 1st January 1831, and examined 8th May 1833 and 24th February 1836.

Wood.	8th May 1833.	24th February 1836.
Teak, East Indian	Very good	Rather soft but good.
Teak, African . .	Very good	A little decayed.
Oak, English . .	Much decayed . . .	Very much decayed.
Oak, Italian . .	Good, but decay had commenced in surface	Very much decayed.
Oak, Canada, White	Very much decayed .	Very bad and rotten.
Oak, Memel . .	Very much decayed .	Very bad and rotten.
Oak, Dantzic . .	Very much decayed .	Very bad and rotten.
Mahogany . . .	Good	Tolerably good.
Fir, Dantzic . .	Much decayed . . .	Very much decayed and rotten.
Fir, Riga . . .	Much decayed . . .	Do.
Fir, Memel . . .	Much decayed . . .	Do.
Larch, Polish . .	Decayed $\frac{1}{4}$ in the surface	Decayed $\frac{1}{4}$ of an inch.
Larch, Scotch, Tree-nails	Surface $\frac{1}{4}$ inch decayed and brittle	Surface $\frac{1}{2}$ inch decayed the rest brittle.
Elm, English . .	Very rotten	All rotten.
Ash, American .	Very rotten	All rotten.

The sap-wood contains much fluid matter, and hence is apt to undergo changes. The sap, besides starch and allied substances, consists of nitrogenous matters, such as albumen, casein, and fibrine, which are fermentescible, and have a great tendency to enter into different chemical combinations. When, by the action of nitrogenous matter, fermentation commences, we find that there is also, in many instances, a development of fungi of different kinds. This is seen in the case of yeast, in which the peculiar form of mould, called the yeast plant, is produced.

It is probable that the sap-wood of some trees is less liable to undergo fermenting changes than that of others. Perhaps in pine wood, the secretion of turpentine and resins, as well as the absence of large dotted vessels, may render the timber more durable. This kind of wood is much used for building purposes. Mr. M'Nab mentions an instance of the durability of Scotch fir, in the case of the astragals of

the greenhouses of the Old Botanic Garden in Leith Walk, which are still in use in the nursery of Messrs. Eagle & Henderson, and must be at least one hundred years old. The very resinous wood of *Abies canadensis* or Hemlock Spruce, is very durable, but it is too knotty for ordinary use. The timber of *Abies excelsa*, the ordinary Red Deal or Pine, or Red Baltic, stands better than that of *Pinus strobus* or White Pine.

The quality of timber depends much on the exposure of the leaves freely to the light and air. The difference of the wood in crowded and properly thinned plantations, depends in a great measure on the growth and exposure of the leaves. Wood grows more rapidly, and the zones or circles are larger when there is free exposure. Hence the necessity of judicious planting if we wish to have good timber. The following measurements made of a Spruce Fir in a crowded plantation of 1000 acres in Yorkshire, and given several years ago in the Gardener's Chronicle, shows the state of the zones of wood in such cases —

In the first five years,	the tree grew	26	tenths of an inch	in diameter.
In the second do.	do.	24	,,	,,
In the third do.	do.	20	,,	,,
In the fourth do.	do.	12	,,	,,
In the fifth do.	do.	8	,,	,,
In the sixth do.	do.	6	,,	,,
In the seventh do.	do.	10	,,	,,

Thus in the course of thirty-five years, the Fir only attained a diameter of 10·6 inches in place of 18 — the annual growth of timber beginning to diminish after the first five years, and the diminution going on with great rapidity after the fifteenth year of growth, when the trees were becoming more and more crowded. At the end of the thirtieth year, the annual growth was little more than one-tenth of an inch, whereas in the early years, it had been more than five-tenths.

The increase in the last five years seems to have been due to some of the trees having been accidentally cleared away, thus allowing more light and air to reach the leaves.

When a tree forms large circles of woody matter, and thus grows rapidly, it has been found that the quality of the timber is better than when the same species forms small circles and grows slowly. An examination was some time ago made of the naval woods in the dockyards of Britain, and it was found that the most durable Oak was that which had grown quickly, and had increased at the rate of one inch in diameter in the course of the year. Some excellent Oak, taken from York Minster, was ascertained to have had an annual growth of eight-tenths of an inch. Professor Barlow, of Woolwich, examined two specimens of timber — No. 1 from a fast-grown tree, No. 2 from a slow-grown tree. Both specimens were squared down to 2 inches, and they were broken on props, placed 50 inches apart. Their specific gravity and their strength are given as follows —

	Specific gravity.	Deflected one-fiftieth of an inch with	Broken with
No. 1	903	660 lbs.	999 lbs.
No. 2	856	414 ,,	679 ,,

Thus the fast-grown timber exceeded the other in specific gravity as well as in tenacity and strength.

In experiments on the strength of timber, it seems to be of importance to notice the way in which the wood is bent. Wood bent outwards breaks with a small strain, and it is only when bent inwards that it shows all its elasticity, as is familiar to archers. This is probably due to the greater hardness of the inner layers of wood.

It is of great importance that trees should grow freely, and that their branches should not intermingle. In this way, we may expect rapid and vigorous growth. If trees

are well planted there ought to be little occasion for pruning. This operation, when practised, should be performed judiciously. Large branches should not be lopped off. Such a procedure is apt to give rise to knots and to decay. Moreover, in cutting off a branch, care should be taken that the cut does not slope in a downward direction, otherwise room is given for the lodgement of moisture, which is very injurious to the timber.

Occasionally, we find that the timber while in a growing state, is injured by accidents of various kinds, or by some peculiarity in the season. In these circumstances the tree may not be killed, but a complete circle of wood may be injured from the want of a proper secretion of cellulose or lignin. This portion becomes covered by layers of new wood afterwards, and it is not till the tree is felled that we detect the injury. Such a decayed portion may materially lessen the durability and elasticity of the wood. *Shakes* in trees are thus caused. On this subject De Candolle remarks — " The layers of alburnum being full of sap are liable to be frozen when the cold is very intense. When this accident takes place, and the tree still continues to live, the frozen layer is covered over by a sound one and afterwards by several others; and thus covered, it is found in the centre of trees. We can, by counting the number of layers formed since the accident took place, know in what year it happened. Thus in 1800 I had cut down in the forest of Fontainbleau a trunk of a Juniper, which was found to present near its centre a layer which had been affected by frost, covered over by ninety-one woody layers, and which dated therefore from the severe winter of 1709."

Timber is liable to decay from any injury to the bark allowing moisture to enter. It also becomes diseased from the roots reaching an unsuitable soil. It is probable that the

disease which prevailed so extensively in the Larch was due in a great measure to this.

Common rot in trees is occasioned by wood being exposed to vicissitudes of weather, moisture and dryness, heat and cold. Hence Sir John Barrow says, it is frequent where a pile is between wind and water, or where a beam enters a wall. This kind of decay is often prevented by external applications, as painting, coating with tar, &c.

This common rot is different from *dry rot*, which is a disease connected with the internal parts of the timber. It has been called sap-rot, in consequence of the elements of it being chiefly in the outer layers of the wood. The nitrogenous matter in these layers is liable to alterations—fermentation taking place from the presence of nitrogenous matters. This is aided by temperature, want of proper ventilation, and other external conditions. It is essentially connected also with the development of a hymenomycetous fungus, called the dry rot fungus. The spores or germs of this fungus are very minute. They are readily introduced by the stomata or pores of the leaves. Some say that they also enter by the roots from the soil.

Many fungi are concerned in the diseases of plants, as well as in diseases to which man and animals are liable. Their spores are universally diffused, ready to light on any place where a nidus is afforded. It is curious to remark the modifications produced on the same fungus by the matter on which it grows. There is a remarkable adaptation to different kinds of soil or decaying matter. So long as the texture is healthy, these spores may have no effect; but as soon as a morbid change occurs, the fungus spreads, modifying the disease, and rendering it more formidable. The germination of the spores is promoted by moisture, and they spread insidiously by means of their mycelium or spawn. This spawn

grows with amazing rapidity, and permeates the tissues of a plant before we are aware of its existence. The rapid manner in which mushrooms and toad-stools spring up is due to the spawn having ramified very extensively underground. Fungi spring up everywhere and suddenly, owing to the millions of germs which they produce, and the power they have of retaining vitality long. The dunghill *Peziza* sends its sporidia or germs from its hymenium in a steam-like cloud. The *Rhytisma acerinum* sends out its sporidia in a vapoury cloud, just at the time when the leaves of the young maples are expanding, and thus it attacks almost every leaf. A single specimen of *Lycoperdon giganteum* produces myriads of spores. Multitudes of spores at once find a proper nidus, and form their mycelium; others lie dormant for a long time, others at once produce fructification, and go on to do this indefinitely, by the spreading of the mycelium. Spores are wafted in the air, and may remain there long, till at length they descend by gravity in some distant part. The trade winds carry spores of fungi for thousands of miles. The ubiquity and unexpected appearance of many species, such as the common kinds of *Aspergillus*, *Cladosporium*, and *Penicillium*, are thus easily accounted for.*

The fungi concerned in dry rot are *Merulius lacrymans* of Fries (the *M. vastator* of Tode), and the *Polyporus destructor* of Fries (the *Boletus destructor* of Schrader). The destruction of the wood, according to Schwabe, is caused by the mycelium of the fungus destroying the woody cells or tubes and their contents, for the purpose of obtaining the nourishment which it requires for its vegetation, by which the latter lose their consistency and toughness. The cellular walls suffer particularly, for they are always seen brittle and torn

* See Berkeley's Introduction to Cryptogamic Botany.

on examining them under the microscope. *Merulius lacrymans* has a great power of absorbing moisture from the atmosphere, and thus carries on the work of destruction rapidly. The following are the characters of *Merulius lacrymans:* Effused, large, yellow, ferruginous, or deep orange; *margin*, white, tomentose; *folds*, large, poroso-sinuate. On examining dry rot timber with the microscope, we find the following appearances more or less evident: — white threads ramifying and spreading throughout the substance, interlacing and matting together, forming a white cottony texture like lint. This is effused on the surface of the timber. In the centre of each mass is a gelatinous substance. In this state it attracts moisture, and distils a watery fluid, hence called *lacrymans.* Then the centre becomes yellow or tawny, has a wrinkled, sinuated, porous consistence, shedding a red powder (the spores or germs) upon a white down. This is the resupinate pileus, the hymenium bearing the germs being upwards in the perfect or mature state. The wood acted on by the fungus crumbles into dust.

Dr. Harvey says * — " May not the seeds of the *dry rot* in timber, attach themselves primarily to particular rings or cylinders of the tree, and have their origin, not so much — or at least so exclusively as some have fancied—in the felling of the tree at a time when it is full of sap, as in the ill-developed and ill-conditioned woody tissue, the produce of the diseased buds or bud-plants of a particular year or series of years? Such tissue, it is conceivable, may be as perishable in its degree and as prone to decay, as the diseased potato-tuber, but the tendency thereto may be prevented, as long as the tree is in the ground and growing, by the more complete exclusion of the tissue from external agencies,

* Letters on Trees and their Nature, by Dr. Alex. Harvey, Southampton.

than does or can obtain in the case of the latter — an exclusion becoming every year still more complete and perfect, by the deposition of new woody tissue around it, breaking forth, however, after the tree has been felled, sawn up and exposed to air and moisture — to the latter especially. It would, I think, be worth while to examine microscopically and otherwise, the timber of trees which are known at a certain period of their growth to have been diseased, and to compare the woody tissue of the cylinders of the several years. There are marked organic differences, easily detected by the microscope, and sensible chemical peculiarities elicited by analysis between the tubers of healthy and diseased potatoes; and like or equally notable differences may exist in the woody tissue of diseased and healthy tree plants."

Mr. John Quekett * mentions an instance of the growth of a fungus inside an oak, which led to the sudden fracture of one of its large branches, nearly 3 feet in diameter. On examining the fracture, he found a cottony-looking filamentous mass mixed with sparkling crystals. The wood had the smell of vinegar; there was no appearance of any direct communication with the external air. The outer parts of the branch seemed to be sound. The growth of the fungus had caused decay of the wood, and the crystals probably arose from the watery parts of the sap being removed and the solid part crystallizing.

It has been shown by mycologists, that the minute spores of some fungi can penetrate into the interior of plants without any evident external lesion. The propagation of Bunt in wheat, shows that the mycelium or some subtle form of it, has the power of penetrating the interior of plants, and of retaining life there uninjured for some months. In

* Microscopical Society's Transactions, i. p. 72.

this disease of wheat, the spores seem to reach the ovule, and to remain dormant until the fruit is fully developed. The occurrence of *Trichothecium roseum* within the cavity of ripe nuts, is perfectly analogous. Many of our timber trees are deeply tainted with fungi before they are felled; and oak, when raised from old stools and not from acorns, is extremely subject to be impaired by the mycelium of *Dædalea quercina.* Hothouses and wooden buildings made of such materials, would speedily show symptoms of destruction.

Mr. Barlow considers the real efficient cause of dry rot to be, that the juices of timber are brought into a state of putrefaction, occasioned generally by exposure to a moderate degree of heat and moisture in a stagnant atmosphere. If an end of a log of wood is placed in a damp or wet situation, the moisture is conveyed by imbibition throughout the whole. The disease spreads wherever moisture finds its way. Beams in floors, also wood of partitions and skirting boards coming into contact with wet walls, are very liable to dry rot. Timber is apt to suffer in the heated hold of a ship. Hence imported timber is often diseased. The Belgian consul at Leith, Mr. John M. Mitchell, has sent to the Museum at the Garden, a very marked specimen of this in a billet of wood from the hold of the ship "Zodiacus," which brought a cargo of bones from Drontheim in Norway, and was three weeks on its passage. The planks were covered with a white fungus.

Merulius lacrymans, or the dry-rot fungus, sometimes extends from the wood-work of buildings to the walls themselves, and by penetrating their interstices, involves them in destruction no less than the wood itself. It becomes a sort of *leprosy* of the walls. In renewing the beams, therefore, care should be taken to ascertain that no disease exists in the walls, otherwise the new beams may speedily suffer.

The dry-rot fungus assumes often very peculiar forms as may be seen in the specimens exhibited. Sometimes these appear to be nothing but a mycelium or spawn. This is as destructive as the most fully formed fungus, and attracts moisture from the air in the same way. Under the form of *Sporotrichum* such imperfect mycelia exist. Mycelial threads often permeate throughout timber. The green Oak, used at Tunbridge for ornamental purposes, owes its tint to the mycelium of *Peziza æruginosa*, the coloured threads of which penetrate it in all directions.

It would appear that the spores of various fungi are modified in their growth according to the nidus in which they grow. The species of these minute fungi have probably been far too much multiplied. Mere varieties of one form have been all considered as separate or independent species. Dr. John Lowe's researches in regard to the common Mould, *Aspergillus*, have proved this in a most satisfactory manner.* The vinegar plant is another instance of the change produced by accidental circumstances in the common *Penicillium glaucum*. This plant, when developed in syrup, assumes the appearance of a mass of mycelium without showing fructification in the usual form. Yeast seems to be a peculiar state also of *Penicillium*, capable of endless propagation without fructifying.

The felling of timber is said to be a matter of importance in relation to this disease. Winter-felled timber is supposed to be the best. So long ago as 1669, a royal ordinance was made, limiting the felling of timber from 1st October to 15th April, and the conservators of forests were directed that the trees should be felled when the wind was at north and in the wane of the moon. The influence of the moon in this matter

* Transactions of the Botanical Society of Edinburgh for 1857.

was considered of importance, and even in the present day, in South America, similar views are entertained. Dr. Archibald Smith of Peru says, that the woodcutters in South America pay attention to the influence of the moon. They believe that timber cut in the *creciente* soon decays, and on that account is not of use for constructing houses, or for any permanent purpose. This is said to be particularly the case with the Willow and Alder, and other soft and sappy woods in the valleys of the interior, as well as on the coast.

Many instances are given of the durability of timber felled in winter, the bark having been removed in the previous spring. Thus the *Sovereign of the Seas*, a ship constructed for Charles I., was two years in building (1636–37). It was made of wood cut in winter, having been barked the previous spring. After forty-seven years it was broken up and was found sound, so that the timber was used for another ship of the same name. In the case of the *Royal William* of 100 guns, the wood was barked in spring, but cut in the winter following. The ship was three years on the stocks, and was finished in 1719. It lasted ninety-four years, and was broken up in 1813. The *Achilles*, 60 guns, was built in 1757, in fourteen months. Its timber was barked in spring while standing, and cut down the following winter. In twenty-seven and a-half years it was taken to pieces and was found all sound.

The method of treating timber after felling, is a subject requiring attention. The desiccation and seasoning of timber is of great importance. This must be accomplished by free exposure to air and sun. Timber should be thoroughly dried before being used in building. Sometimes rapid desiccation is accomplished by charring, the superfluous moisture being driven off. Immersion of timber in earth, sand or water, is sometimes had recourse to. In the latter case,

the water dissolves the viscid fermentescible matter, and then the timber can be more easily dried by a current of air. The solution of nitrogenous matter is sometimes effected by boiling or steaming. This process, however, may impair the strength and elasticity of the timber. It is said that the timber of a prow bent, by the steaming process, is less liable to decay. Salt water has occasionally been used, but it is apt to leave dampness in the wood.

Another mode of preserving timber is by impregnating it with foreign matter, calculated to stop decay and prevent the fermentation of the nitrogenous juices. One of these is Kyanizing, or the employment of a solution of corrosive sublimate according to Kyan's patent. The wood is steeped in the solution, or the fluid is made to pass rapidly through the timber when placed in a vacuum. After this process the timber should be thoroughly dried. Berkeley says, that a cellar, which has long been dripping from the prevalence of *Merulius lacrymans*, will soon become dry when a strong wash of corrosive sublimate is applied.

Burnettizing, or the employment of a solution of chloride of zinc, according to Sir William Burnett's process, is another mode of preservation. In 1841 the following statement was made in regard to this process — "Government have recently ordered the opening of the fungus pits in Woolwich dockyards, which had been closed in August 1836, for the purpose of testing the virtues of Sir William Burnett's process for rendering wood, cordage, and all descriptions of woollen, free from the effects of dry rot. The result, it would appear from the report of the officers deputed by the Admiralty to superintend the experiments, is in every way successful, the prepared wood being as clear and sound when it came out as when first deposited. Some samples of prepared canvass and calico were submitted to the same test, with their counterpart

unprepared, and the former were as sound as when taken from the loom, whilst the unprepared was entirely destroyed. In consequence of these favourable results, the Admiralty have been induced to take the patent under their especial patronage, and a large iron tank is being erected, with air and force pumps, for the speedy saturation of timber in the Royal Dockyard at Portsmouth. Other tanks are in the course of formation in Chatham Dockyard. It would likewise appear that metals are prevented from oxidation by this process, and consequently, the fastenings of ships' timbers are preserved from rust or decay. It further appears, that articles prepared with this material will become less inflammable, in proportion to the strength of the solution used."

In Sweden, a solution of sulphate of iron or copperas is much used for hardening and preserving the wood of wheel carriages.

Mr. Bethell uses creasote for the preservation of wood. The creasote acts by coagulating the albumen, and preventing putrefactive decomposition. Along with the creasote, there are other products of the distillation of coal tar, especially bituminous oils, which enter into the cells, and by surrounding the woody fibres, prevent the action of water and air. There are two methods pursued — 1. By placing the wood in a strong iron cylinder, exhausting the air from it by an air-pump, until a vacuum is produced, equal to about 12 lbs. on the square inch; then the creasote is allowed to flow into the cylinder, and afterwards pressure is put on the creasote by a force-pump, equal to about 150 lbs. on a square inch. The timber is then taken out fit for use. 2. By placing the timber in a drying-house, and passing the products of the combustion of coal tar through it. Thus the timber is dried rapidly, and impregnated to a certain extent with oily matter, and with the creasote given off from the

fuel used to heat the house. The timber is then taken out and immersed in hot creasote in an open tank. A load of fir timber will absorb 40 gallons; close-grained woods less. A cubic foot of Beech usually weighs 8 lbs. heavier after being so prepared. Creasote is said to prevent the decay of wood, and to stop the attacks of *Teredo navalis.* The preservation of wood in the Irish bogs may be due, in part, to creasote.

About eighteen or twenty years ago, Dr. Boucherie suggested a plan of making trees take up preservative matter in a growing state, and of making the vital energy of the plant the agent by means of which the fluid was absorbed. He attempted to render the wood of trees more durable and hard while its elasticity is retained, to prevent warping, and to diminish its combustibility, by causing the stem, in the fresh state, to absorb solutions of pyrolignite of iron and of chloride of lime. This may be done either when the tree is in the ground, or immediately after being felled. In a growing state, he made a large opening in the lower part of the trunk, sawing out a portion of the stem, so as to allow the tree to be supported only by two narrow portions of the wood on each side; then, by putting a waterproof bag around the stem, below this large transverse opening, so that he could insert the fluid into it, he found that he could cause the tree to absorb rapidly a large quantity. By this means the fermenteseible sap was displaced by a fluid less liable to change. Sometimes he caused the tree to be cut down, and to be placed in an inclined position, with the lower end of the trunk immersed in the fluid to be absorbed; at other times the tree was laid in a horizontal position, while the barrel, cistern, or bag containing the fluid, was placed in a vertical position above the cut extremity. Boucherie's plan of preserving timber was practised on a large scale in the forest

of Compiegne, and was favourably reported upon by several physiologists.

The Permanent Way Company in London have adopted Boucherie's method in the preparation of railway sleepers. Soon after the tree is felled, the logs (large enough to make from 2 to 4 railway sleepers) are laid horizontally on *three* wedges, one in the middle and the other two near the ends. A saw-cut is made in the middle of the log, penetrating about nine-tenths of the thickness, and leaving thus one-tenth uncut. The log is then slightly raised by means of the wedge in the centre, or by a lever placed at the centre, so as to open the saw-cut partially. A piece of unravelled cord is then placed round the saw-cut, and close to the outer circumference of the tree, as far as the part remaining uncut, and the two ends of the cord are then taken up and crossed at the upper part of the cut. The wedge or lever is then lowered so as to allow the parts of the tree to come together again. The saw-cut then closes on the string, and there is formed a water-tight joint, the space between the two ends of the log being sufficient to contain a small quantity of fluid. The logs at the cut are, as it were, caulked tight round. An auger hole is then pierced obliquely from the upper side of the log into the saw-cut. A nozzle of wood or metal is introduced into it, the conical end of which is attached to a flexible pipe of water-proof cloth, connected with a cistern or reservoir elevated from 30 to 40 feet above the tree intended to be preserved. The fluid from the cistern will thus pass into the space formed by the saw-cut.

When timber is to be prepared in whole lengths, without being cut, a cap is fitted to the end of the stem by means of screws or dogs, the end being placed around the circumference as before, so as to separate the cap from the wood, and form a water-tight cavity. The tube is applied

to the centre of the cap, and connected with the cistern as above. In operating on large trees, a saw-cut is made a few inches from the bottom, one-tenth being uncut. An augur hole is driven obliquely from the surface into the saw-cut. The cut is filled with cord as before; then a strong wooden plate, covered with plastic clay, is applied to the base of the trunk; this plate is fixed by a screw, which pierces through its centre, and penetrates into the log a few inches beyond the saw-cut. Thus the joint is made tight, and the fluid is prevented from escaping at the end of the tree.

Channels, ranged in parallel lines, placed under the ends of the logs, and under the saw-cuts, receive the liquid which has percolated through them, or which has escaped through imperfectly-made joints. This fluid is conducted back by a fall to a tank fixed under the reservoir, whence it is pumped up into the tank, so as to be used again when properly concentrated. The liquid flowing along can be stopped by compressing the flexible pipe by means of a piece of wood split at one end, the two parts of which are drawn together and tied with twine.

Various solutions were tried, and it has been ascertained that a solution of sulphate of copper, 1 lb. by weight of sulphate to 100 of water, is the best. The specific gravity of the fluid is 1006 to water 1000. Boucherie uses $2\frac{1}{4}$ lbs. to 22 gallons. This solution passes easily through the timber. In order to ascertain the complete impregnation of the wood, the fluid is tested, as it flows out, by means of prussiate of potash — the nature of the red-brown colour produced indicating the degree of penetration.

Some trees are better fitted than others for this process. Those of quick growth, and of a loose texture, are most easily permeated by the fluid. Such trees as Scotch Fir, White Fir, Beech, Birch, Poplar, Alder, and Hornbeam, are well

fitted for the process. The fluid cannot be made to pass through fully formed oak. Those kinds of wood which possess most sap-wood, and of the same kind, those which are grown in the dampest soils, are most easily penetrated. Hence, the least esteemed kinds of timber, and consequently the cheapest, are those which afford the best results.

The length of time required for the processes varies according to the nature of the tree and the length of the logs. For a log 8 feet 6 inches long, the process of impregnation requires about two days, when the timber is newly felled, and the reservoir at about 3¼ feet of elevation. If longer felled, then longer time is required.

The Permanent Way Company state, that with a reservoir of higher elevation, the impregnation is effected more rapidly. Thus they say, that in the case of railway sleepers for ordinary lengths of 9 feet, 24 hours only are required. Trees of 40 feet in length were prepared at Fontainebleau for the French navy in eight or ten days.

A block of Beech absorbed as follows —

Under 3 feet 3 inches,			pressure	15·00	oz. in	10′.
„ 11	„ 9	„	„	50·30	„	„
„ 21	„ 0	„	„	86·96	„	„

Another block felled some time previously —

Under 3 feet 3 inches,			pressure	1·78	oz. in	10′.
„ 11	„ 9	„	„	19·40	„	„
„ 21	„ 0	„	„	33·50	„	„

It is said that a pressure of 65 feet produced no effect on a disc of heart of oak only 8 inches thick.

Increase of weight, after impregnation, depends on the nature of the wood. If there is much air in the stem, then the replacing of it by fluid will add much to the weight.

Birch increased . .	2 lbs.	for 35	feet cube.
Hornbeam . . .	46 „	„	„

Oak	50	lbs. for	35	feet cube.
Poplar (one experiment)	50	,,	,,	,,
White Fir . . .	53	,,	,,	,,
Oak sap wood . .	55	,,	,,	,,
Poplar (another experiment)	70	,,	,,	,,
Scotch Fir . . .	127	,,	,,	,,
Alder	156	,,	,,	,,
Beech	209	,,	,,	,,

When a liquid, containing about $2\frac{1}{4}$ lbs. of sulphate of copper to 22 gallons of water has been forced through a log, it appears, after allowing for the sulphate carried off by the sap, that each cubic metre* of wood has retained from 11 lbs. to 13 lbs.

The cost of preparation is as follows —

Preparation of sleepers cubing about $3\frac{1}{2}$ feet each, cost on an average $11\frac{1}{4}$d.

The cost of sulphate of copper for the impregnation of a single railway sleeper is about 5d.

The apparatus required for small quantities of timber, costs from £10 to £15; for a railway of 200 miles, £50.

Wood prepared in this way has been used extensively in railways in France, both for sleepers and for telegraph posts. It is said to have stood the test. In place of the usual Oak telegraph posts, White Pine posts have been used. They are said to be as durable and much less expensive. The timber thus prepared has also been employed in the French navy. The commissioners who report on Boucherie's process say — That the telegraph posts of Fir lasted more than six years without any alteration, in situations where ordinary fir posts would have been cut off level with the ground in two years, and Oak itself in six years. Prepared

* A metre is equal to 3 feet, 3·3708 inches English.

Beech scantling, used as railway sleepers, suffered no change by remaining six years in the ballast. Its durability in these circumstances exceeding Oak. The strength of timber, so prepared, is said not to be inferior to ordinary timber.

The Paris jury state, that they saw sleepers of Beech, Alder, Birch, and Fir, prepared by Boucherie's sulphate of copper method, and which had been nine years under ground, and yet were not rotten. They reported also, that poles for telegraphs and vineyards lasted well.

The following solution, according to the late Mr. Pringle of Whytbank, was used by Mr. Richard Griffiths, of the Board of Works, Ireland, with success, for steeping timber—

1 lb. sulphate of copper.
1 lb. sulphuric acid.
Six gallons of water.

Dissolve the sulphate of copper in one gallon of boiling water. Then add five gallons of cold water. Mix well, and then add the sulphuric acid. The timber should be dry when steeped. Twenty-four hours is sufficient for small scantlings, and a longer time in proportion for large ones.

Beech, prepared with sulphate of copper, is liable to split on exposure to the air. A solution containing the deliquescent salts attacks more or less severely the iron nails and bolts. This defect requires remedy.

The following results of experiments, upon various descriptions of timber, prepared by Boucherie's patent process, were made at Derby by Mr. P. W. Barlow and Mr. W. H. Mills, in May 1856, and were conducted under a pressure of 30 feet. They are reported by the Permanent Way Company.

No. of Experiment.	Date.	Description of Wood.	When cut down.	Length.	Average Diameter.	Cubic Content.	Amount of pure Sap forced out before Solution perceptible.	Amount of Solution used to effect this.	Time in forcing pure Sap out.	Total Amount of Solution run out of Tank during operation.	Time of Operation.	Amount of Solution used per cube foot.
				Feet.	Inches.	Feet.	Quarts.	Quarts.	Hours.	Quarts.	Hours.	Quarts.
1	April 29, 1856	Beech	January, 1856	18	$12\frac{1}{4}$	$14\frac{3}{4}$	33	64	4	104	$8\frac{1}{2}$	7·04
2	May 1, 1856	Spruce Fir	April 23, 1856	18	$11\frac{1}{4}$	$13\frac{1}{2}$	27	50	5	95	12	7·00
3	May 5, 1856	Poplar	April 1, 1856	$18\frac{1}{4}$	$11\frac{1}{4}$	$13\frac{1}{2}$	Copper perceptible from commencement			130	11	9·60
4	May 7, 1856	Elm	Dec. 1855	18	$11\frac{1}{4}$	$13\frac{1}{2}$	—	—	—	156	23	11·52
5	May 9, 1856	Alder	Feb. 1856	18	11	12	43	58	$1\frac{1}{2}$	176	31	14·64
6	May 10, 1856	Memel	——	$18\frac{1}{4}$	11by11	$15\frac{1}{4}$	Copper perceptible from commencement			230	50	15·08
7	May 22, 1856	Birch	May 21, 1856	18	$12\frac{1}{4}$	$14\frac{3}{4}$	32	34	25 minutes	184	$3\frac{1}{2}$	12·00
8	May 23, 1856	Scotch Fir	——	18	$12\frac{1}{4}$	$14\frac{3}{4}$	35	47	6	130	58	8·80

Details are also given by the Company of the experiments with the different kinds of wood. The following are the particulars of the experiment with the Scotch Fir.

TIME.	Time running quarter-pint of Liquid. Root end. m. s.	Top end. m. s.	Quantity of Liquid ran out of Tree.	Quantity of Solution ran out of Tank.	Amount ran out of Tree in half-hour.	Amount ran out of Tank in half-hour.	REMARKS.
			Quarts.	Quarts.	Quarts.	Quarts.	Began to drop slowly at root end in 19 minutes, at top end in 23 minutes. Pure Sap in both cases.
1st half-hour	only just dropping		...	4	...	4	
2nd	...	...	1	8	1	4	
3rd	2 19	2 53	4	12	3	4	
4th	2 13	2 42	7	16	3	4	
5th	2 9	2 31	11	21	4	5	
6th	2 11	2 29	15	25	4	4	
7th	2 19	2 38	18½	29	3½	4	
8th	2 17	2 37	22	33	3½	4	
9th	2 18	2 34	25½	37	3½	4	Sap pure as at first.
Ran 2 quarts in night			27½	total amount			
10th	2 45	3 15	29	42	1½	5	
11th	2 30	3 0	32	45	3	3	
12th	2 30	3 0	35	47	3	2	
13th	2 50	3 0	38	50	3	3	Copper just perceptible at each end.
14th	2 50	3 15	41	53	3	3	
15th	2 35	3 0	44	56	3	3	
16th	3 0	3 30	46½	58	2½	2	
17th	3 0	3 30	49	61	2½	3	
18th	3 0	3 45	51½	63	2½	2	
19th	3 15	4 0	53½	66	2	3	Copper coming out strong at both ends.

Pressure kept on. Ran out of Tree 64 quarts in 48½ hours, making a total of 130 quarts in 58 hours.

This Tree was cut up — Copper faintly perceptible all over.

Mr. Hyett* applied Boucherie's plan for the purpose of giving colour to wood, by causing a tree to take up a diluted solution of one salt, followed after complete impregnation by another saline solution, which, by chemical combination with the first, gave rise to a certain colour; thus a weak solution of ferrocyanuret of potassium was followed by a solution of a salt of iron, so as to give a blue colour.

Of late years, *sulphur* has been recommended as a remedy for diseases in which fungi appear. The flowers of

* Transactions, Highland Soc., vol. xiv.

sulphur, dusted on the diseased vine, is said to be successful in preventing the attacks of the *Oidium tuckeri*, or the fungus concerned in the vine disease. Sulphur being insoluble, may act when sprinkled on plants, by means of a change induced — oxygen, in a nascent state, coming from the plant being combined with the sulphur, so as to form sulphurous acid.

Dr. Price recommends, for the vine disease, the use of pentasulphide, or pentasulphuret of calcium, applied in a diluted state. This is decomposed by the carbonic acid which exists in the atmosphere, and thus the sulphur is deposited so as to form a uniform coating on the vine branch. This solution is prepared by boiling 30 parts by weight of caustic lime, with 80 parts by weight of flowers of sulphur, suspended in a sufficient quantity of water. Heat is applied until the solution has acquired a dark red colour, and the excess of sulphur ceases to dissolve. The clear solution is drawn off, and after dilution with water, may be applied to the vines by means either of a syringe, or a sponge or brush. A saturated solution of the pentasulphide may be diluted with from twelve to twenty times its volume of water previously to being employed. Solution of sulphuret of potassium may also be employed. It may be mixed with an acid before being applied with the syringe, and thus a deposit of sulphur takes place over all the parts to which the fluid is applied. Sulphurous acid has also been recommended as a remedy for fungoid diseases in plants. It may be used for dead tissue, such as felled timber, but its destructive effects on vegetable life prevents its application to living plants. Drs. Christison and Turner found that it acted injuriously to living plants in very minute quantities.*

* Edinburgh Medical and Surgical Journal, vol. xxviii.

The great cause of decay in wood is moisture. Wood in a dry state may be preserved for a long time, as may be seen in the case of wood in some old buildings, as Westminster Hall. Saw-dust is wood in small pieces; when wet it soon rots, but when dried thoroughly, it may be kept for an indefinite period. To have timber in the driest state, it ought to be felled between the fall of the leaf and the spring, the nearer the former time the better. The timber of some trees is much more subject to decay than that of others. The wood of the Cypress is very durable.* A great error in building is painting wood early, and thus enclosing within it the elements of decay, by not allowing the escape of moisture. In olden times, the wood was left bare, and exposed to currents of air which kept it dry. Hence its durability. Such is the case with the roof of Westminster Hall, which dates from the time of Richard the Second, and still is sound. So also the wooden roof of York Minster, constructed in the thirteenth and fourteenth centuries; also the timber of the Hospitium, constructed about the same period in the garden of the Yorkshire Philosophical Society. Old doors and ancient pews in village churches, owe their durability to the same causes, namely, thorough drying, by exposure to air without being covered with paint or plaster.

Whatever may be done in regard to the felling of timber, drying it thoroughly, and impregnating it with antiseptic matters, it is clear that much depends on the mode in which it is afterwards used in building. Wood is always apt to take up moisture. Rafters and beams ought to be kept free of moisture by proper ventilation. The want of proper

* Chests containing Egyptian Mummies were made of Cypress. The gates of St. Peter's at Rome, which had lasted from the time of Constantine to that of Pope Eugene the Fourth, *i. e.* 1100 years, were of Cypress, and had during that time suffered no decay.

ventilation is a great cause of disease attacking timber. This want of ventilation is often seen in old buildings, and even in some of modern date. Thus dry rot from this cause apparently made its appearance not long ago in the timber of the College of Surgeons' Hall in Edinburgh, and it has been recently detected in Donaldson's Hospital. A very instructive example has been supplied to me by Mr. Cousins, the city architect. In regard to the specimen, he says — "The specimen of dry rot which I now transmit to you, affords a rather striking example of that disease. The timber was new and of good quality, and had not been fixed in its place more than twenty months, before the rot had committed extensive ravages. It was in a floor of a shop in Princes Street, Edinburgh, and the rot commenced at the top. Indeed, the *floor boarding* was the first part infected, and the disease gradually crept upwards. The deafening in this case consisted of dry furnace ashes, covered with a coating of lime, the whole depth being about 2½ inches. The timber was all new when put into its place; and although it had got the ordinary amount of exposure to the air, or 'seasoning' as it is called, the natural sap could not be entirely dried up.

"Now this is just what happens in every new building, without exception, and therefore dry rot must be explained as arising from some other cause. In my humble opinion, it arose from the following cause — So soon as the premises were finished, the first thing the tenant of the shop did, was to cover the entire surface of the floor, except under the counters and side cases, with 'Kamptulicon,' as it is called, or a kind of floor-cloth, composed principally of India rubber, and forming a perfectly air-tight and compact body. The floor boarding speedily showed indications of rot, by yielding under the foot on passing over it; and on the floor-cloth

being removed, the boards were found to be covered over with a white fungus and completely decayed. The portions of the deals under the counters, and along the side walls, were not decayed to the same extent."

The ventilation must be complete. Professor Syme mentions the case of a wine cellar, where the wood below the bottles suffered from dry rot. Openings were made above and below without much effect, and it was not until complete ventilation was established that the rot was got rid of.

A good way of ventilating, seems to be, to have the spaces under the floors, &c., communicating with a flue carried up the wall, near the chimney, so as to keep up a constant current. Builders are often careless in filling up the spaces between the beams of the floors. They put in all kinds of rubbish for deafening. This deafening material consists often of decaying matter, containing seeds of disease. Great care is required in this matter.

The laying of the ends of beams in the moist walls seems to be also a cause of decay. The ends are not exposed to a current of air, and they are surrounded by moisture. Hence they are liable to rot. It is a matter worthy of consideration, whether the ends of the beams should not be placed on brackets, projecting from the wall. This subject, as well as the tendency of damp sawdust to become mouldy and communicate disease, is alluded to by my friend, Mr. William Gorrie of Prestonhall, Ford, near Dalkeith, in the following letter —

" On the home farm here, we have a saw-mill, driven by the thrashing-mill engine, and chiefly used for cutting up Larch, Fir, and other woods employed in forming park fences, &c. The most of this wood being cut up in a green or unseasoned state, its *saw-dust* quickly assumes the appearence of *rot*, and rapidly affects or rather infects the lower

parts of the sawing bench, which are most in contact with the saw-dust. So much so, that those parts have had to be thrice renewed within about ten years, although made of 8 inch square well-seasoned timber, twice with the red wood of Larch, and once with red Pine — and that although standing in a dry shed, constantly exposed to a thorough current of air. (I send you herewith a specimen of the saw-dust and wood in the states referred to).

" Here there is an instance in which two of the reputed preventives of *dry rot* are inefficacious, viz. — *Seasoned wood* and *exposure to air*, both of which are powerless against contagion, when once that 'leprosy in the house' (Levit. xiv. 34) is introduced.

" No doubt, *proper seasoning* and exposing of wood to *air draughts*, are great preventatives of *dry rot*. Neglect of the first by architects is unpardonable, and some of the modern appliances for effecting the latter, are to say the least questionable, such as introducing currents of air under floors, between the plaster, lath, and walls, &c., by which dwellings are not only made cold and uncomfortable, but great facilities are thereby afforded for the perambulations of rats and mice, while wide dissemination is often secured for sewerage and other unsavoury smells; and in cases of burning, the rapid spreading of the flames is greatly promoted. After all, the desired end is only partly obtained, for the rot generally commences in the ends of the beams and joisting, which are beyond the reach of any air currents, being built into the walls, in conformity with the modern system of house building, which requires the wood work to support the walls instead of the walls supporting the wood work, as of old, when the desired end was obtained, by the joisting being made to rest on stone brackets, projecting inwards from the walls, as may be seen in ruined castles, &c. throughout the country."

I have thus endeavoured to give a very imperfect sketch of the structure of timber, and of the disease called dry rot. There is much still to be done in the way of protecting timber against this destructive disease. Enough I trust has been said, to indicate the points which deserve attention; and if I have in any way given hints which may be followed by beneficial practical results, I shall feel that I have not addressed you in vain on the present occasion.

[The Lecture was Illustrated by numerous Large Coloured Drawings and Diagrams, as well as by Specimens of Decayed Timber, in various conditions, and of the Fungi which give rise to Disease in Living Plants and to Decay in Dead ones.]

PRINTED BY W. H. LIZARS, EDINBURGH.

TRANSACTIONS.

SESSION EIGHTH.

1857-1858.

TRANSACTIONS

OF THE

ARCHITECTURAL INSTITUTE OF SCOTLAND,

In Continuation of Selection from its Proceedings.

SESSION EIGHTH,

1857–1858.

VOLUME V. PART II.

EDINBURGH:

PRINTED BY W. H. LIZARS, 3, ST. JAMES' SQUARE.

M.DCCC.LIX.

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Transactions of the Architectural Institute of Scotland,
Session 1857-58.

No. I.

THE WATER WORKS

OF

THE ANCIENT ROMANS,

THE

NATURAL SPRINGS, AQUEDUCTS, RESERVOIRS, BATHS, AND DRAINS OF ROME.

BY

ALEXANDER THOMSON, Esq. of Banchory.

[*Read at a Meeting of the Institute, held in Edinburgh on 15th February* 1858.]

An abundant supply of pure water is a matter of primary importance to every family, and the greater the number of families collected together within a limited space, the more essential it becomes, both for health and for comfort, that the supply be ample, and if possible profuse.

The ancient Romans were well aware of this, and expended a great amount of money, and applied much scientific skill to bring water to the metropolis, and also to the larger provincial cities, and to provide places where the water thus introduced might be employed for public use and recreation, as well as for domestic purposes.

The ruins of these works are among the most imposing of the remains of ancient Rome, and the most careless traveller must have his attention arrested by the long but

broken lines of arches extending here and there across the desolate Campagna towards the Sabine and Alban Hills.

NATURAL SUPPLIES OF WATER WITHIN THE WALLS.

The early inhabitants of Rome depended for their supply of water on the Tiber, and on the natural springs which rose up in various parts of the Seven Hills, and, according to the ordinary chronology, four centuries and a half elapsed before any other was introduced.

The volume of the Tiber is indeed ample, but at Rome its waters are at all times too turbid to be employed except for the most ordinary purposes; they are unfit for drinking or cooking, unless artificially prepared, and would only be used in their natural state by a people unaccustomed to the comforts of civilised life.

The impurity of the Tiber does not arise from matters held in chemical solution, but from the quantity of clay and other substances held in mechanical suspension, derived from the soil through which it flows for many miles before reaching Rome. It is so muddy, that it is impossible to see an object a few inches below its surface. The Anio joins it at a short distance above the city, and the contrast betwixt the two streams is very remarkable; the Anio of a blueish tint, but translucent as crystal, speedily disappears amid the liquid mud of the Tiber.

It is justly described by Virgil as

"Multâ *flavus* arenâ."—*Æneid*, vii. 31.

and by Ovid as

"*Arenosi* Tybridis unda."—*Ovid. Fasti*, i.

and by Horace

"Vidimus *flavum* Tiberim retortis
Littore Hetrusco violenter undis
Ire dejectum monumenta regis
Templaque Vestæ:" — *Hor. Carm.* i. 2.

and such it is at all seasons of the year.

But when old Tiber is allowed by the poet to describe himself, he does it in far more flattering terms —

. . . . . "Ego sum, pleno quem flumini cernis
Stringentem ripas, et pinquia culta secantem,
Cœruleus Tybris, cælo gratissimus amnis."—*Æneid*, viii. 62.

We are not aware of any ancient writer who compliments the Tiber on its purity, except Dionysius Periegetes, who, in his Metrical System of Geography, composed during the reign of Augustus, calls it a pure stream—

"Θυμβρις ἕλισσομενος καθαρὸν ῥοὸν ἐις ἁλα βαλλει."

There is, however, no accounting for tastes, and, notwithstanding its impurity, there have been persons who drank the water of the Tiber in preference to any other.

The Popes, Clement VII., and Paul III., are said to have invariably carried a supply of it with them on their journeys; and Gregory XIII. never drank any other, and lived to the age of eighty-four.*

Ariosto, also, writing to his brother of certain things which he wished to find ready prepared for him on arriving in Rome, specially orders Tiber water, which had been allowed at least six days to settle itself —

"Fa ch' Io trovi dell' acqua, e non di fonte
Di Fiume si, che gia sei di veduto,
Non abbia Sisto, ne alcun altro Ponte."—*Ariosta, Sat.* iii.

During these six days it would have ample time to

* Melchiorri, parte i. p. 93.

deposit its mud, or perhaps it may have undergone a slight fermentation, similar to that which renders Thames water so desirable on shipboard for long voyages.

Rome must also have derived a considerable supply from springs rising either within the walls, or in their immediate vicinity, and from one or two small rivulets.

Several springs are named by ancient writers, of which the most celebrated are those of Juturna in the Forum, and of Mercury near the Porta Capena. The waters of the fountain of Juturna were considered specially suitable for sacrificial rites, as well as to be possessed of healing properties,* and those of Mercury to have the power of washing away the guilt of perjury from those who duly sprinkled themselves with it, and also of procuring more than fair profits in business —

> " Est aqua Mercurii portæ vicina Capenæ
> Si juvat expertis credere, numen habet
> Huc venit incinctus tunicas mercator, et urna
> Purus suffita, quam ferat, haurit aquam,
> Uda fit hinc laurus: lauro sparguntur ab uda
> Omnia quæ dominos sunt habitura novos
> Spargit et ipse suos lauro rorante capillos
> Et peragit solita fallere voce preces,
> Ablue preteriti perjuria temporis, inquit,
> Ablue preteriti perfida verba die.
> * * * * *
> Da modo lucra mihi, da facto gaudia lucro
> Et face ut emptori verba dedisse juvet
> Talia Mercurius poscentem ridet ab alto
> Se memor Octygias surripuisse boves."—*Ov. Fast.* v.

It is, however, in vain now to attempt to discover these. They are buried deep under the accumulated soil of ages, and find their way unseen into the sewers or the river.

* Fabricii Descr. Urb. Romæ, c. 15.

Even the celebrated fountain of Egeria is unknown, for what is pointed out to travellers under that name, is clearly a nymphæum of comparatively recent date — the appendage of some suburban villa.

There is, however, one fountain so interesting from its associations, that, though twelve miles from Rome, it deserves a passing notice — the Caput Aquæ Ferentinæ, in the Vallis Ferentinâ. It was consecrated to the Dea Ferentina, and under the deep shade of the trees which surrounded it, the Latins held their Diets, mentioned by Livy,* and also by Dionysius Halicarnassus.† Pompeius Festus says, "They were held here from the destruction of Alba, A.U. 87, till the consulship of Decius Mus, A.U. 415."‡

At the upper end of the Valley the Aqua Ferentina still gushes forth, from a little grotto in the Tufa Rock, in a most copious stream—probably unchanged in quantity and purity since the days of Turnus and Evander—and the trees around look so ancient, that one could almost imagine them to have been eye-witnesses of the Latin Diets, and of the cruel and treacherous murder of Turnus Erdonius Aricinus, by Tarquin the Proud (Liv. i. 51). ‖

The spot is rarely visited by travellers, and yet it is not difficult of access, either from Albano, or by striking

* "Jam magnâ Tarquinii auctoritas inter Latinorum proceres erat, quum in diem certam ut ad Lucum Ferentinæ conveniant, indicit, esse quæ agere de rebus communibus velit. Conveniunt frequenter primâ luce."—*Liv.* lib. i. c. 51.

† "Κοινὴν δὲ τȣ ἔθνȣς αγοραν εν Φερεντίω ποιησαμενοι, ψηφίζονται μὴ παραχωρεῖν Ρωμαιοις της αρχης."

"Sed indicto Ferentinum publico gentis concilio decernunt imperio Romanis haud cedendum esse."—*Dionys. Halicarn.* lib. iii. p. 175.

‡ Gell. i. 163.

‖ "Novo genere lethi, dejectus ad caput aquæ Ferentinæ, crate superne injectâ, saxisque conjectis, mergeretur."—*Liv.* lib. i. c. 51.

off to Marino, about the tenth mile from Rome, on the Albano road. The Vallis Ferentina separates the Hill of Marino from that part of the Mons Albanus which forms the northern side of the lake, and is altogether a scene of beauty and interest unsurpassed in the vicinity of Rome.

It is surprising that neither the waters of the Alban lake, nor of this abundant fountain were ever, so far as we know, employed to supply an aqueduct; perhaps a superstitious feeling of *religio loci* may have deterred from applying the Aqua Ferentina to any such vulgar use. It seems very probable that the spring itself is fed by natural infiltration from the Alban lake. The waters of the lake and of the Aqua Ferentina flow across the Campagna in separate channels, but near each other, and fall into the Tiber about half-way betwixt Rome and Ostia.

Two considerable natural springs are now made of use on the southern slopes of the Quirinal, the Aqua del Grillo, and the Aqua di San Felice, and several others rise up on the Janiculum, in sufficient quantity to turn mill wheels, but not one can be identified with any classical name.

A beautiful little limpid stream, the fountain of San Giorgio, rises by the side of the Cloaca Maxima, at the point where it is now open in the Velabrum, and immediately flows into it and disappears in the turbid contents of the great sewer. Some say that it is the water of the fountain of Juturna, which has found its way from the Forum to this point; but there is no proof of the fact, for it has never been traced by excavations. The water is reputed to possess medicinal qualities, and at certain seasons the Romans, of the lower classes, resort to it on this account —probably its best quality is derived from the remarkable contrast betwixt it and the contents of the Cloaca.

The city is now so abundantly supplied from other

sources, that there is no inducement to search out natural springs, whether ancient or modern.

AQUEDUCTS.

The population of Rome appears to have rapidly increased in the fourth century after its foundation, and by the middle of the fifth, the local supply of water was altogether insufficient for the wants, and unsuited to the growing luxury of the inhabitants.

The first aqueduct was accordingly constructed in the year U.C. 442, by the same Appius Claudius who formed the Appian Way,* and who, in constructing these two important works, completely emptied the public treasury.†

Appius employed many artifices in order to have the period of his censorship prolonged,‡ to enable him to complete his road and his aqueduct; and that he might thus secure to himself alone the glory of these works, he induced his colleague, C. Plautius, to resign office before the regular time, by a false declaration that he was himself to do the same.‖ By this mean trick, he succeeded in handing down

* Frontinus de Aquæd. c. 4.

† Diod. Sic. xx. 36.

‡ Multis tergiversationibus extraxisse censuram traditur, donec et viam et hujus aquæ ductum, consummaret.—(*Front.* c. 4.) Livy also alludes to the transaction, laying the blame of it on the Senate. "Et censura clara eo anno Appii Claudii et C. Plautii fuit; memoriæ tamen felicioris ad posteros nomen Appii, quod viam munivit, et aquam in Urbem duxit, eaque unus perfecit; quia ob infamem atque invidiosam Senatus lectionem verecundia victus collega, magistratû se abdicaverat.—*Liv.* lib. ix. cap. 29.

‖ Frontinus de Aquæd. c. 4.

his name to the present day in connection both with the Appian Way and the Appian Aqueduct, while that of his colleague, perhaps the more deserving citizen of the two, has barely escaped oblivion.

We are more fortunate in regard to aqueducts than any other Roman antiquities, for we have a detailed account of them as they existed at the commencement of the second century of our era, drawn up by Julius Frontinus, who was named Præfectus Aquarum by Nerva, and continued in the office under Trajan.

Frontinus was a man of good common sense, one proof of which has been preserved by Pliny, who in one of his letters mentions that he had forbidden the employment of any portion of his fortune in the erection of a monument to his memory, saying—" The expense of a monument is altogether superfluous; my memory will endure if I have deserved to live." *

The office of Præfectus Aquarum was one of much importance and dignity, and bestowed on persons of the highest rank. Before being appointed to it, Frontinus had been three times consul, once as the colleague of Trajan, and for several years, before the arrival of Agricola, † he commanded an army in Britain, and carried on war against the inhabitants of Wales and the west of England,‡ A. U. C. 828–831, A.D. 72–75, and he died A.D. 106, A.U.C. 856, ‖ having thus flourished in the end of the first and beginning of the second century of our era.

As soon as he was named Præfectus Aquarum, he com-

* " Impensa monimenti supervacua est; memoria nostri durabit si vita meruimus."—*Plin.* Epist. ix. 19.

† Tacitus, Vita Agric. c. 17.

‡ Poleni Vita Frontini, c. 7.

‖ Ibid. c. 42.

menced his duties by composing his "Commentarius de Aquæductibus," in order, as he tells us, in the second chapter, to qualify himself for the discharge of his new duties, and also for the benefit of his successors in office.*

When Frontinus composed his treatise, there were nine different Aqueducts which brought water into Rome. These were the Appia, Anio Vetus, Marcia, Tepula, Julia, Virgo, Alsietina (also named Augusta), Claudia, and Anio Novus.

The increasing number of inhabitants, and the large demands for water for purposes of luxury and amusement caused the introduction of great additional supplies, even after the time of Frontinus; and this was effected partly by the construction of entirely new aqueducts, and partly, perhaps principally, by the introduction of new streams into those already in existence.

Procopius tells us distinctly, that there were fourteen when Vitiges besieged Rome,† A.D. 537, and that he broke down portions of all those which were above ground,‡ so as completely to cut off the supply of water from the city. The Regionaries, writing about A.D. 370, make the total number of aqueducts twenty-four or twenty-five, but in all probability the ten or eleven thus added by them were either branches from, or additional springs introduced into one or another of the fourteen, and it is now difficult to point out certain remains in or near Rome, even of all the nine of Frontinus.

* Hujus commentarii fortassis pertinebit et ad successorum utilitas; sed cum inter initia administrationis meæ scriptus sit, imprimis ad meam institutionem regulamque proficiet.—De Aquæd. c. 2.

† Romæ vero aquæductus decem et quatuor numero sunt. Procop. de Bello Gothorem I.—(Latin Translation of Raph. Volterranus, p. 278.)

‡ "Gothi . . . ædificia omnia, quibus aqua in urbem devehebatur mox interscindunt, ne prorsus invecta hostibus, sui copiam faceret."—(Ibid.)

The aqueducts, considered as a whole, were certainly great works — though scarcely deserving of the exaggerated terms in which some of the ancient writers describe their vastness; — of their usefulness it is impossible to speak too strongly, and the principles on which they were planned and executed may furnish us with useful practical hints at the present day. Frontinus, who is entitled to speak strongly in their praise, places them above the Pyramids of Egypt, and the celebrated but useless works of the Greeks.*

A correct idea of their extent will be obtained from the following details of the original nine, as given by Frontinus —

The measures are in Roman miles and paces, and there is a slight discrepancy (of about 700 paces) betwixt the details and the totals, probably caused by errors of copyists in transcribing the numerals.

Name.	Length.	Culvert or Tunnel.	Bank or Wall.	Arches.
1. Appia	11.190	11.130	.60	...
(Augustan branch)	6.380	6.380	...	...
2. Anio-vetus	43.	42.779	.221	...
3. Martia	60.710	54.247	.528	6.935
4. Tepula } 5. Julia... }	15.426	8.426	.528	6.472
6. Virginis	14.105	12.865	.540	.700
7. Alsietina or Augusta	22.172	21.814	...	.358
8. Claudia	46.406	36.230	3.685	6.491
9. Anio Novus.....	58.700	49.300	1.609	7.791
	278,089	243.171	7.171	28.447

* "Tot aquarum tam multis necessariis molibus Pyramides, videlicet otiosas compares, aut cætera inertia, sed famâ celebrata opera Græcorum."—*Front. de Aquæd.*, cap. xvi.

In round numbers the total length of these nine was 278 miles, of which 243 were underground work, *i.e.*, culverts or small tunnels — 7 miles were supported by embankments or plain walls, and 28 miles were supported by arches — with which latter our ideas of an aqueduct are apt to be rather exclusively associated.

It will probably be making a very liberal allowance for subsequent aqueducts, if we suppose that they were doubled betwixt the days of Frontinus and those of the Regionaries; and if we do, and add to them all the provincial aqueducts of which remains exist, they are not to be compared in magnitude even with the canal works of Great Britain — a petty province of Imperial Rome.

The Roman aqueducts were all constructed on what is now termed the gravitation principle.

The simple idea was to turn a stream of water from its original course, and to convey it in an artificial channel (canalis or specus) to the place where it was required.

In order to do this, it was necessary to form the channel with a slight inclination, so that the water might run freely forwards. Vitruvius directs that the slope shall be half-a-foot on 100 feet, *i. e.*, 1 in 200;* but Pliny † requires only a quarter of a foot on 100 feet, or 1 in 400.

It was necessary to provide against the accumulation of air in the specus, and, for this purpose, vents or chimneys (lumina or columnaria) were inserted from 120 to 140 feet apart, and, but for this precaution, the compressed air would have impeded the flow of water, or perhaps burst the specus. These are often to be seen in the ruins.‡

* Vitruv. viii. 7.

† Plin. H. N. xxxi. 6.

‡ Etiam in ventre columnaria sunt facienda per quæ vis spiritus relaxetur.—*Vitruv.* viii. 7.

It was equally necessary to keep up the level, so that the water might reach the proposed terminus, and hence the necessity for embankments, walls, and arches. The specus itself is, properly speaking, the aqueduct, the other parts are merely its accessories, and wholly subservient to it.

It has been warmly disputed whether or not the ancients knew the fact that water in a closed pipe rose to the level of its source. The fact itself is distinctly asserted by Pliny—"Subit altitudinem exortus sui;" and apparently he knew even how to construct a springing fountain. "Laminæ esse debebunt, per quas surgere in sublime opus fuerit, e plumbo."*

The principle then was doubtless known to them, but it does not appear to have been employed to any extent, and certainly not in bringing the great supplies of water into the city. There still exists a small ruin by the side of the Via Sacra, called the Meta Sudans, which some suppose to have been a springing-up fountain, though it is quite as probable that the water fell down its ornamented sides as that it rose up. The name, Meta Sudans, is equally applicable to either form. Metal pipes, both of lead and of bronze, were extensively used in the final delivery of the water throughout the city, but with no small suspicion of danger in using them, especially the leaden.

Pliny says—"it is best to convey the water in earthenware pipes;"† and Vitruvius denounces the use of lead pipes as unwholesome. "Water from earthenware pipes is much more wholesome than from leaden, because the water is so vitiated by the lead, that white lead is pro-

* Plin. Nat. Hist. xxxi. c. 6.

† "Cæterum a fonte duci fictilibus tubis utilissimum est."—*Hist. Nat.* xxxi. 6.

duced, which is said to be injurious to the human body."* And again — "on no account is water to be conveyed in lead pipes, if we wish it to be wholesome."†

The Romans formed their lead pipes in a very different manner from our modern practice. A flat sheet of lead was rolled up so as to form the pipe, and the size of each pipe was named from the number of inches (16 to the foot) of width of the flat lead before being rolled up — thus a width of 10 inches formed a pipe named denaria, one of 5 inches quinaria, and so of others.‡

Frontinus points out the inaccuracy of this mode of calculating the size, and proposes to derive the names from the actual diameters of the pipes.‖

The drawings, Plate I., give specimens of these pipes from Donatus, and a glance will show that they were not calculated to resist pressure; it is even doubtful if the edges were soldered, probably they were only pressed together. There is no mention of soldering by Vitruvius or Palladius.

Vitruvius speaks also of pipes of thick leather — "tubuli crasso corio;"§ and Palladius of wooden;¶ neither of which would be employed in extensive permanent works.

The mode in which the water was introduced into the aqueduct was very simple. If the supply was derived from

* "Multo salubrior est ex tubulis aqua quam per fistulas; quod per plumbum videtur esse ideo vitiosa quod ex eo cerussa nascitur; hæc autem dicitur esse nocens corpori humano."—*Vitruv.* lib. viii. cap. 7.

† "Itaque minime fistulis plumbeis aqua duci videtur, si volumus eam habere salubrem."—*Vitruv.* lib. viii. cap. 7.

‡ Pliny and Vitruv. *ut supra.*

‖ Front. de Aquæd. cap. 25.

§ Vitruv. viii. 7.

¶ Palladius, lib. ix. cap. xi.

springs, they were carefully sought out, as is particularly noticed by Frontinus, in the case of the Aqua Virginis, and the water was at once introduced into the specus.

If a portion of a river was to be employed, as in the two supplied by the Anio, a weir or dam was constructed across the stream, and the desired quantity thus diverted into the artificial channel.

In order to preserve the level (libra), and at the same time avoid the cost of embankments, walls, and arches, the specus was conducted, sometimes in a very devious course, along the sides of hills, to their points of junction, so that the artificial line greatly exceeded the actual distance from the fountain head to the city.

When cut through solid rock, building was unnecessary; but when through earth or gravel, the whole was carefully lined, either with stone or brick; and in every case the specus was very carefully coated with well prepared plaster (opus signinum), and on the perfection of this part the efficiency of the whole depended. Many examples of it still remain in situ, and may be easily examined. It was prepared and laid on, coat after coat, with the greatest care.

Pliny gives a recipe for preparing the best quality of plaster, termed Maltha, which is not now in use. He directs fresh quick lime to be slaked, not with water but with wine, and rubbed up with hog's lard and juice of figs; and this he declares will be the most tenacious of substances, and harder than stone.*

The commentator on Vitruvius, Philander Castalionius, asserts that this substance was employed in coating the

* "Maltha e calce fit recenti, gleba vino restinguitur. Mox tunditur cum adipe suillo et ficu, duplice linamento; quæ res omnium tenacissima, et duritiam lapidis antecedens; quod malthatur, oleo perfricatur ante." — *Plin. Hist. Nat.* xxxvi. cap. 24.

whole specus, piscinæ and castella of the aqueducts. It might be worth while now to try the experiment on a small scale.

The work, however, was not always perfect. Several of the poets allude to the water dripping from the arch of Drusus, which carried the Antonine branch-aqueduct across the Via Appia, beyond the Porta Capena, and within the modern Porta San Sebastiano.

Martial complains of its big drops —

> "Capena grandi porta qua fluit gutta." *

And Juvenal writes —

> "Substitit ad veteres arcus, madidamque Capenam." †

The specus were of various dimensions, according to the quantity of water which they had to convey; but that of each aqueduct seems to have been uniform throughout.

The Claudian	was	6 feet high	by	4 feet 3 inches	wide.	
„ Marcian	„	5 feet 6 in.	„	2 feet 6	„	
„ Julian	„	5 feet	„	1 foot 9	„	
„ Tepula	„	4 feet	„	2 feet	„	

The historian Procopius is guilty of gross exaggeration on this subject. He asserts, that each of the fourteen great aqueducts in his day had specus of such dimensions, that a knight on horseback could ride along inside of them. Unfortunately for his correctness, six of these specus may still be seen and measured at the Porta Maggiore and Porta San Lorenzo, and the loftiest would barely allow his knight to walk along erect, without his horse and without his helmet.

Plate II. illustrates the position of specus resting upon arches, and shows how one was placed above another, and also the application of the air holes or ventilators.

* Martial, iii. 47. † Sat. iii. 11.

PISCINÆ, OR RESERVOIRS FOR PURIFICATION.

If the water was not perfectly pure at its source, it was introduced into one or more piscinæ or reservoirs before entering the city; and also, in the case of public baths, it was generally again submitted to the same process before being delivered for use.

The Aqua Virgo and the Aqua Appia were so limpid, that they required no piscinæ; nor was one applied to the Alsietina, the worst in quality of all the waters brought to Rome, but destined only for naumachiæ and other purposes, where purity was of little importance.

Of all the other aqueducts, the piscinæ were very important or rather essential parts.

The principle of their construction is very simple. The water is introduced into a large covered space, broken into a number of compartments, through which it moves slowly, and thus has time to deposit whatever matters it may hold in mechanical suspension, and from which it issues, pure and limpid, into the specus.

Some of the piscinæ appear to have consisted of two stories, one above the other, as shown in a plan given by Fabretti; see Plate III. Others consisted of only one story, as that of the Baths of Diocletian; see Plate IV.

The water drawn by the two aqueducts from the Anio was of course liable to be discoloured by rain, and on this account a *piscina limaria* was erected for each of them betwixt the weir, which diverted the water from the bed of the river and the commencement of the specus.

Frontinus states, that six of the streams were received into six separate but adjoining piscinæ, so that each preserved its own level, at a spot about seven miles from Rome,

on the Via Latina;* and extensive substructions may be seen not far from the site thus indicated, but not in a state to be identified, nor to give any information as to their size or structure.

One region of Rome, the twelfth, was named the Piscina Publica, from a very extensive reservoir which was there in early days, but which had ceased to exist under the empire; for Festus in his Lexicon states, that the name of the Piscina Publica remains, but the thing itself no longer exists. †

It is clear enough, from what Festus goes on to say, that this was not properly a piscina for the use of an aqueduct, but a large open pond for bathing and swimming; and, as a place of public resort, it had been superseded by the more luxurious Balineæ and Thermæ, long before his time.

Martial also speaks of a piscina as a swimming-place —

"Piscinam peto, non licet natare." ‡

It is possible that the site of this great Piscina Publica may be marked by the garden of the monastery of San Giovanni e Paolo — an extensive and perfectly level parallelogram, constructed on the side of the Cælian Hill, adjoining the Colosseum, and commonly, but most incorrectly, named the Curiæ Hostiliæ. If this conjecture be correct, then the site of it was afterwards occupied by the great Stagnum Neronis, whose remains are what we now see. A very slight

* "Ex his sex, via Latina, intra vii milliarium contectis piscinis excipiuntur ubi quasi respirante rivorum cursu limum deporcunt." — *Frontin.* c. 19.

† "Piscinæ publicæ nomen manet, ipsa non extat, ad quam et natatum, et exercitationis alioqui causâ veniebat populus."

‡ Mart. Epigr. iii. 33.

inspection may convince any one that the whole space was constructed for a reservoir, and the solid substructions of opus quadratum speak plainly of imperial times. The boundaries of the fourteen regions are very uncertain, and this spot is near, if not within that named Piscina Publica, which was the twelfth. It is best known to travellers from its possessing the finest palm tree in Rome.

There are, however, indisputable remains of piscinæ, which give us ample information as to their structure.

The most perfect in Rome is known by the name of the Sette Sale — employed for the final purification of the water used in the Baths of Titus.

Notwithstanding its name, this ruin consists of nine, not seven, long parallel vaults, with openings for communication from one to another, and these placed, not opposite to each other but diagonally, so that the water had to pass through as great a space, and be brought in contact with as much surface as possible, betwixt its entrance and its exit. It is worthy of notice, that the tops of these openings have not *round* but *pointed* arches (as shown in Plate V.), of which we only remember to have seen one other specimen of Roman work — viz., in the roof of the small aqueduct at Tusculum. (See Plate VI.) The brick work of the Sette Sale is very substantial, and the plaster several inches thick, of the finest lime and terra pozzolana, mixed with small fragments of brick or tufa, and so thoroughly hard that water could never penetrate it. A considerable deposit has been formed upon it while the piscina was in use, in some parts nearly one-fourth of an inch thick. Part of the height of the arches is now filled up with mud and rubbish, so that the original floor cannot be examined.

The vaults are each 12 feet 4 inches wide, and, at present, 8 feet 6 inches high, and the middle vault is 136 feet 6

inches long. Those on each side of it become progressively shorter, as the inner end of the building forms a curve. (Plate VII.) It is certain that these vaults were used as a piscina; but most probably they belonged originally to an older building than the Baths of Titus, for they do not correspond in direction with their other remains. Nibby, in his edition of Nardini,* states, that there is another range of vaults, similar in every respect, below those now seen, and wholly filled up by earth and rubbish. Such an arrangement would greatly increase the purifying effect of the piscina, and, if arranged after the plan shown from Donatus (Plate III.), no level would be lost. There are four apartments, two above and two below. The water flows from the specus into one of the upper, falls into that immediately below, passes into the second lower, and rises up through it into the one immediately over it, on a level with the first, and then flows on by the specus, on the original level.

The Plate No. VII. shows the arrangement and divisions of the nine compartments of the Sette Sale, and No. V. exhibits the pointed tops of the openings.

The remains of several other piscinæ may be seen in Rome. One of considerable extent can be traced adjoining the Baths of Diocletian, remarkable from its irregular form, as shown by Plate No. IV. It is 293 feet long, 84 wide at one end, and 28 at the other, and the walls 5 feet thick. It is not divided, like the piscina of Titus, by walls having openings, but by forty-six strong square pilasters, 5 feet on the sides, and thus exposing a large extent of surface to receive the mud of the water.

Other piscinæ occur in the garden of the church of San Vitale, on the Viminal, and in the Vigna Conti, near Sa.

* Nardini, vol. i. p. 252, foot note. (Nibby's Edition.)

Croce, which probably belonged to the Baths of the Empress Helena. The Baths of Caracalla had no piscina, but a simple reservoir of no great size behind the Theatridium, sufficient only to equalize the supply. The water for them had been sufficiently purified in the distant piscinæ.

The most perfect examples now existing of piscinæ are the two at Baiæ, erected probably for the use of the Roman fleet stationed at Misenum. The Piscina Mirabilis is subterraneous — two staircases of forty steps lead down to the bottom. It is 225 feet long, 75 wide, and 20 deep, divided, on the same plan as that of Diocletian, by forty-eight large pilasters into five corridors. The building is partly of stone and partly of brick, and of great solidity. The walls are covered by a thick coat of plaster, and a singular stalactitic deposit occurs on the pilasters, which is most abundant near the floor, and diminishes in quantity as it ascends. Water is said to have been brought a distance of forty miles to supply it.

The Cento Camerelle, at no great distance, are another piscina, consisting of two parallel corridors, intersected at right angles by a third, each being about 7 feet wide and 20 high. It is supposed to have been a reservoir for rain water, from the absence of stalactitic deposit on the walls.

There are numerous small piscinæ all around Baiæ and Pozzuoli, for the use of the summer villas of the luxurious Romans.

The nine aqueducts of Frontinus were constructed in the following order —

1. The Appian, by Appius Claudius, A. R. 441. Its sources were on the left side of the Via Prenestina, betwixt the seventh and eighth mile from the city.

2. The Anio Vetus, by Manlius Curius Dentatus, about forty years after the Appian, or A. R. 481. The water was

taken from the Anio at twenty miles from Rome, and the expense defrayed from the spoils of Pyrrhus.

3. The Marcian, by the Prætor Marcius Rex, by order of the Senate, A. R. 608, or one hundred and twenty-seven years after the Anio Vetus. Its sources were near Subiaco, thirty-six miles from Rome.

4. The Tepula in the year 627, brought from the neighbourhood of Tusculum, the springs being near the tenth mile stone of the Via Latina.

5. The Julia was an addition to the Tepula, constructed by Agrippa, A. U. 719. The springs were situated at the twelfth mile stone of the Via Latina.

6. The Aqua Virginis was introduced by the same Agrippa thirteen years after, *i. e.* A. R. 732. It rose in a marsh eight miles from Rome on the Via Collatina, and is said to derive its name from the spring having been pointed out by a young woman to the soldiers employed to search for one.*

7. Aqua Alsietina or Augusta, by Augustus, from the Lacus Alsietinus, near the Lake of Bracciano, the ancient Lacus Sabbatinus, fourteen miles from Rome on the Via Claudia, according to Frontinus, but in fact nearer the Via Cassia.

8. The Claudian. This aqueduct was commenced by Caligula A. R. 789, but completed by Claudius A. R. 803. It had its source near Subiaco (Sublaquium), thirty-eight miles from Rome, from two very copious fountains, named Cærulus and Curtius, and five others; all of which may still be seen.†

9. The Anio Novus, also by Claudius, was taken like the Vetus from the river Anio, but much higher up, at forty-

* Front. cap. 10.

† Nibby Viag. Antiq. 1, 215.

two or forty-four miles from Rome. Afterwards Trajan, to avoid the frequent impurity of the water of the river, supplied the aqueduct from the small lake above the Villa of Nero at Sublaquium. "Anionis quoque novi vitia excludi posse videt. Omisso enim flumine, repeti ex lacu qui est super villam Neronianam Sublacensem ubi limpidissima est, jussit." *

The Fons Herculanus, a spring of very pure water, rising near the sources of the Claudian, was brought across the river and added to the Anio Novus; and Frontinus regrets that its purity should be lost in the waters of the Anio.†

The accompanying outline Map, Plate VIII., copied from Nibby, Viaggio Antiquario, gives some idea of the course of the aqueducts down the valley of the Anio, near Tivoli.

It is difficult to speak with certainty of the waters introduced into Rome after the days of Frontinus; it seems impossible to identify any of them except the Alexandrine, constructed by Alexander Severus, about A. U. C. 980 or 985, or about A. D. 230. It was supplied by a fountain about sixteen miles from the city, nearly half way betwixt the Lacus Regillus and the town of Pedum. It has been very carefully examined and illustrated by Fabretti.‡ Many others are named; but probably they were only additions to the older aqueducts by the introduction of new springs. In this manner, doubtless, the supply to the city was greatly increased; and many long ranges of arches were built within the city to convey water from the old aqueducts for the baths, and for other public purposes; and hence has arisen an inextricable confusion in the names.

* Front. cap. 93.

† "Natura purissimus, sed mixtus gratiam splendoris sui amittit." —*Front.* cap. 15.

‡ Fabretti, Dissertaz. i.

Any good map of the neighbourhood of Rome will give some idea of the singular manner in which the various lines approached and diverged from each other, and wandered, apparently without much reason, across the Campagna, most of them nearly or altogether meeting at last when they entered the city. It will be observed, that with the exception of the Alsietina, they all lie to the east of Rome.

Having now in some measure traced the water of the aqueducts from their sources to the walls of Rome, it seems desirable, before proceeding to the consideration of the mode of its distribution through the city, and the uses to which it was applied, to inquire into the principles on which the works hitherto mentioned were planned and executed. There are several principles brought out in the formation and arrangement of a Roman aqueduct which certainly deserve our attentive consideration, if not our imitation.

The water, from the moment it was introduced into the specus, never saw the light of day until it was brought into the city and ready for distribution. In this respect it exactly imitated a natural subterranean stream and spring.

In this country, it is common to commence the introduction of a supply of water into a town, by constructing an immense open reservoir covering many acres of ground. Into this, dead and decaying animal and vegetable matter of every kind must find its way; there it decomposes and furnishes food to myriads of microscopic plants and animals, and the larger Infusoria and Larvæ, which so greatly disgust water drinkers in our large towns. Nor is this an evil which gradually abates; on the contrary, the longer an open reservoir exists, the more productive of minute life does it become. The accumulation of suitable food, both

for microscopic plants and microscopic animals, goes on every day, and the organisms increase in proportion to the supply of food in a locality exactly suited to their nature and habits.

The presence of these beings in water is thoroughly distasteful, especially in the larger forms of larvæ; and yet they are in themselves a wonderful example of the goodness of the great Creator. But for their operations stagnant waters would be a thousand times more pestilential than they are. The organisms are not the cause of evil, but a proof of its existence, and to a large extent its immediate remedy. The mischief does not consist in the minute organisms, but in the decaying organic matter which they do their utmost to consume; and the rapidity with which they increase, and the amount of work which they perform, is one of the greatest marvels of Creation. Wherever they are wanted they speedily appear; their ova, or germs, or seeds, seem to be everywhere present — in air, earth, and water, waiting only a suitable habitat, and a supply of decaying matter requiring to be removed; and there they multiply to an extent which may be stated in numerals, but which it is difficult to comprehend. They are the ever present, ever active sanitary commissioners of the whole earth — which, without their labours, would in many localities be uninhabitable; and in some good qualities, they surpass other sanitary commissioners — for they make no speeches — they print no blue books, and they levy no rates — they only do their appointed work.

This, however, is not the place to enlarge on this most interesting topic, farther than our immediate object requires. We must be content with stating, that of a great number of the organisms of which we speak, it is at this moment quite uncertain whether they be plants or animals, but that

many of them have coverings of pure flint, indestructible by fire, water, or any other ordinary agent; others have coverings of lime, and most of the rest have hard horny coverings, both of them indestructible by water; so that when once established in a reservoir, they must of necessity be delivered to the consumer along with the water.

Geologists are well aware of the existence of vast deposits of these remains in many parts of the world. Beds of 20 and 30 feet in thickness, and extending over many square miles of country, are formed almost exclusively of them — the undeniable deposits in the bottoms of ancient ponds and lakes; and, in like manner, future geologists may find grand accumulations in the present reservoirs of water for our great cities — just as microscopic observers at the present day get from them their best and most varied supplies of objects for examination. Papermakers are also aware of their injurious effects on the finer qualities of paper, and minute though they be, are obliged to use many devices to prevent their entering into the composition of the pulp, and thereby effectually injuring their work. It is not, however, difficult to get rid at once of these minute beings, for they must have light; place them in the dark and they perish; instead of an open reservoir, erect a piscina completely covered over, and fill it from underground springs and they can never appear; fill it from streams and they cease to live and multiply.

The Romans knew little of these inhabitants of water — and nothing at all of the more minute and more numerous — but that practical sense which so greatly distinguished them in many respects, somehow taught them the necessity of applying a practical remedy to an evil, which was probably felt more than it was understood. They carefully excluded the light of day from the moment the waters entered the specus until they were delivered at the Castella, and they

nowhere constructed an open air reservoir—all the work was underground.

Vitruvius, speaking of the specus, lays down the rule absolutely—"eæque structuræ confornicentur, ut minime sol aquam tangat"—"let them be arched over, so that the sun may on no account touch the water."*

This principle deserves our most careful consideration at the present day. The construction of covered reservoirs, like the Roman piscinæ, would clear our supplies of water of the greater part of their animal and vegetable ingredients, and furnish consumers with the pure element, and would also put an end to the great loss sustained by the evaporation from the surface of extensive open reservoirs, and would deliver the waters very nearly at the temperature of the fountains from which they are derived, instead of having them, as at present, thoroughly warmed by exposure to the summer's sun, and only partially cooled in their progress along pipes to the points of delivery.

There is, however, one serious objection to the Roman mode of introducing the supply of water to a city on arches above ground, that it affords an obvious means of inflicting much annoyance in the event of a hostile attack, or even of a popular tumult. An aqueduct raised on arches is a very conspicuous object, and a few men in a short time can open the specus and cut off the whole supply which it contains. Frontinus was well aware of this danger, giving it as one reason for the underground culverts, "ne facile ab hostibus interciperentur, cum frequentia adhuc contra Italicos bella gererentur."† And it has been already noticed, that this plan was adopted by Vitiges, A.D. 535, and probably few of the aqueducts were repaired, perhaps none of them for

* Lib. viii. c. 7.

† Front. c. 18.

many centuries; probably this contributed more than any other injury to the very rapid decay of Rome after the days of Belisarius. There can be no doubt that in the constant wars and sieges which took place during the long death-struggle of Rome, and especially during the wars of the Barons, the materials of the now useless aqueducts were employed without remorse, like those of so many other buildings, within a moderate distance, for the repair of the walls, or the erection of temporary defences. Most destructive of all were the operations of Pope Sixtus V.; who, though he may deserve some respect from this Institute, as the erecter of the Egyptian obelisks, and the finisher of the dome of St. Peters, can deserve only our strongest reprobation as the destroyer of innumerable remains of ancient Rome, which had survived all the vicissitudes of time and war down to his days — and which, but for him, would doubtless have still remained.

Native writers on Roman antiquities frequently, but very guardedly, notice his pulling down the arches of aqueducts and other buildings to procure their materials — and with all their deference to the papal authority, they cannot refrain from condemning him — and, above all, for his wanton destruction of the celebrated Septizonium. He wanted stones and bricks for the erection of a large portion of the Vatican Palace, and for the completion of the Dome of St. Peter's — and he was not a man to see a thing he wanted within his reach and not put forth his hand to take it, and there was no one bold enough to prevent him.

The levels of the aqueducts were all different. The Anio Novus was the highest, and the Alsietina the lowest, but it is not now easy to say to what particular aqueduct many of the existing remains belonged.

One only cannot be mistaken, the Claudian, which had its arches constructed of Gabine stone; unfortunately the operations of the Barons and the Popes have left us only a few fragments — the finest are those incorporated in the city walls, near the Porta Prenestina. (See Plate IX.) All the others have arches of brick (laterizia), and the loftiest were those of the Anio Novus, part of which, according to Frontinus, were 109 feet in height,* and some of the remaining arches seem to be about this height.

By far the finest arches now standing are those of Nero's branch from the Claudian; there are no harder bricks, nor any more perfect brick-work in Rome. (See Plate X.)

In general, it may be said of the arches in the Campagna, that those nearest the Appian Way are of the Marcia, Tepula and Anio — while those nearest the Via Prenestina are probably Alexandrine — some, very possibly, are remains of branches leading supplies to private villas, as near Roma Vecchia, and foundations exist farther on towards Albano, asserted to be of the Claudian, though it is difficult to imagine that this aqueduct could have wandered so far away from its natural line to preserve its level, which could be easily managed by a few feet of additional height of building.

There is one very lovely spot, about five miles out on the Via Latina, where both ancient ivy-covered aqueducts, and the arches of the modern Aqua Felice, cross the road.

When the aqueducts entered the city, they of necessity crossed some of the principal roads, and there ornamental buildings were erected to convey the specus, without interrupting the traffic, and to serve also as convenient places for inscriptions in honour of the various builders and repairers.

* Frontin. c. 15.

Of these, three still remain. One, the arch of Drusus, near the Porta San Sebastiano; one at the Porta Maggiore, and another at the Porta San Lorenzo.

That of Drusus is a single arch, of large blocks of Travertine, with two columns of Marmo Africano, of the composite order. It was originally erected by the Senate in honour of Drusus, and was afterwards employed by Caracalla to support the specus of the branch aqueduct which he formed to convey water to his baths. The specus is very conspicuous, and several of the adjoining arches still remain. (See Plate XI.)

At the Porta Maggiore, the Claudian aqueduct crossed the Viæ Labicana and Prænestina, and here the emperor erected one of the very striking monuments of ancient Rome. It is in the form of a triumphal arch, with a separate opening for each road, one of which has long been closed. It is constructed of blocks of Travertine and Peperine, without cement, and is very massive both in style and structure. It has three long inscriptions; the uppermost recording the great work of Claudius; the second, the repairs of Titus; the lowest, those of Vespasian. When Honorius altered the walls, he embraced this arch as a portion of them, and adapted the two arches to the two roads; and an inscription above the Via Labicana records the work (A. D. 402).

This noble building was considerably shaken by the operations of Sixtus V. in introducing the Aqua Felice. See Plate XII. for its present state, and Plate XIII. for the supposed original design. The inscription is given in the Appendix at A.

Immediately behind the Porta San Lorenzo stands a similar monument, supporting the three specus of the Marcia, Tepula, and Julia; and, though considerably damaged, still bearing the inscriptions of Augustus, Titus, and Caracalla.

It is composed of blocks of Travertine. The accumulation of earth is so great, that it is buried up nearly to the springing of the arch. This detracts much from its effect; and it is also, like the former, greatly encumbered by modern buildings; but, notwithstanding, it is one of the most striking remains of Rome — and both bring before us, in closest contact, ancient magnificence with modern poverty. See Plate XIV., and for the Inscriptions Appendix B.

CASTELLA AQUÆ.

The aqueducts thus brought within the city walls were conducted, partly at once to the baths or other public places, which they were intended to supply, but principally to the various castella aquæ, whence the water was furnished for the daily use of the inhabitants. A castellum is thus defined by Ulpian — " Castellum . . est receptaculum quod aquam publicam suscipit." *

The position of the castella was fixed by the level of the specus of each aqueduct; but the difference betwixt them within the city is much less than might be expected, considering the very different levels of their sources.

Five of them reached the highest parts of the city.† The highest was the Anio Novus; next the Claudia; third, the Julia; fourth, the Tepula; then the Marcia; sixth, the Anio Vetus; seventh, the Virgo; eighth, the Appia; and, lowest of all, the Alsietina.‡

There is one very interesting ruin, which seems to be un-

* See Marliani, p. 204.

† " Quinque autem aquarum altitudo in omnem partem urbis attollitur." Front. cap. 18.

‡ Front. *ut supra.*

questionably a castellum of the Aqua Julia. It is popularly known by the name of the Trofei di Mario. It stands at the point where the Via Prenestina and Via Labicana diverge from each other. Remains of arches of the Aqua Julia can be traced up to its immediate vicinity, and Piranesi ascertained, that the level of the specus still remaining in it corresponds with that of the Julia at the Porta Tiburtina (San Lorenzo), and Fabretti * supposes that Nero conducted a part of the waters of the Claudian to the same spot. It is from its situation well adapted for a castellum, and its remains indicate an extensive building — now unfortunately in a very dilapidated condition. Excavations made about 1820 leave little doubt of what it was, and two separate specus still remain; but this is not a conclusive proof that two different aqueducts supplied it. Placed betwixt two great roads, it probably delivered water on both sides. (See a Plan of it, Plate XV.) A very ingenious and probable restoration of it is given in Burgess' Rome, vol. i. p. 202.

The castella, then, were places where the water was delivered into a spacious basin, whence it was sent forth along pipes to the localities and purposes, public or private, which it was destined to supply; but principally, so far as domestic use was concerned, to the lacus or public cisterns, established in every part of the city.

The castella themselves were of two classes, either public or private. The great public castella divided the water into three separate reservoirs — one for the use of public baths, one for that of private houses, and the third for the public fountains; and this was so arranged, that when the supply was scanty, the least important might be cut off.†

* Diss. i. c. 11.

† " Cumque venerit ad mænia, efficiatur castellum et castello con-

Each aqueduct had many castella — the Appia delivered its water at 20, the Anio Vetus at 35, the Marcia at 51, the Claudia and Anio Vetus at 92.*

It is highly probable that the building in the Chiavico del Bufalo, into which a portion of the modern Aqua Felice flows, is an ancient castellum of the Aqua Virginis. The inscription on the wall commemorates the restoration of it by Claudius. It is a relic which few travellers seem to visit, and yet it is one of much interest, as presenting to us, at any hour of the day, a scene probably very closely resembling the transactions at a castellum aquæ of Imperial Rome — the same coming and going of the bearers of water, and the same loitering to gossip or to quarrel. (See Plate XVI., and Inscription No. C.)

The two principal modern fountains of Rome, the Fontana di Trevi, and that of San Pietro in Montorio, also very much realize our ideas of a castellum aquæ. Copious streams of water are poured into an extensive basin, whence it is conveyed in pipes to the neighbourhood, after furnishing supplies to all who chose to *carry* from it. Plate XVII. represents the modern fountain of the Aqua Paola at San Pietro in Montorio. The introduction of such public Castella into our own towns would add greatly to their beauty as well as to their healthfulness and cleanliness. They would be every way advantageous, except perhaps to the collectors of water rates.

From the castella the water was distributed to public and

junctum, ad recipiendum aquam, triplex immissarium, collacenturque in castello tres fistulæ æqualiter divisæ intra receptacula conjuncta, uti, cum abundaverit, ab extremis in medium receptaculum redundet. Ita in medio ponentur fistulæ in omnes lacus et salientes; ex altero in Balneas ut vectigal quotannis populo præstent; ex quibus tertio in domos privatas, ita, ne desit in publico." — *Vitruv.* lib. viii. c. 7.

* Front. 79-86.

private uses under the charge of the *aquarii.* It is difficult, if not impossible, to ascertain the exact meaning of the details given of this by Frontinus; but the general principle seems to have been, that the water was turned on into each service pipe by the aquarius for a given space of time; and the size of the pipe being known, the supply of water given was ascertained — perhaps not very correctly.

It is, however, probable, that the greater part of the population of Rome was not supplied by water conveyed into their houses, but had to fetch it from the "lacus," or smaller reservoirs, established in great abundance in every region of the city. According to Publius Victor, the number of these was 1352; and, as the same authority gives the number of "Insulæ," or masses of building containing a number of separate dwellings (like the "hotels" of Paris or the "lands" of Edinburgh), at 46,602, it follows, that there was about one lacus to each thirty-three houses.

Another very large demand for water was to supply the balineæ. Of these the greater part were private, but a few were public, and of considerable extent, the immediate predecessors of the imperial thermæ. The private balineæ doubtless continued in use even after the erection of the public baths. Victor enumerates 1006, and as he gives the number of domus, or separate residences of the wealthier families at 1780, it follows, that more than half of the *palaces* of Rome, if we may so translate domus, had each its own separate bathing establishment. The water was supplied to the balinea in the same manner as to the lacus, by pipes; and, judging from what we see in Pompeii, we may suppose, that all who could afford it had private cisterns in their courts, into which the water ran for a fixed period every day. It does not appear that any attempt was ever made to raise the water to the upper floors of the

houses. The great mass of the people were doubtless supplied by carrying it to their homes from the various lacus throughout the city, as is still the practice in Italy, and indeed over the continent generally.

A water tax was paid by all who had private service pipes; but we have failed to discover any indication of the amount. The water in the *lacus* seems to have been free to the public, or perhaps paid for by a general rate on houses.

Frontinus placed bronze mouths on the ends of the water pipes next the castella, to prevent the frauds of the aquarii by tampering with the pipes, and he placed all these calices on the same level, that each might draw off exactly the same quantity of water.*

A private castellum was occasionally erected for the accommodation of two or more houses, and was then erected at the mutual expense of the proprietors; but, when once erected, it came under the entire control of the public officers.†

It would be interesting to know something of the quantity of water brought into Rome by the aqueducts. Very minute details are given by Frontinus; but it seems utterly hopeless to attempt to calculate from them; for, notwithstanding their prolixity, they do not furnish the necessary materials.

Various guesses have been made by modern writers; but they are little more than conjectures. Melchiorri states the quantity as equal to the average stream of the Seine at Paris. The same authority gives the produce of the three comparatively small aqueducts which now supply Rome, at 180,500 cubic metres in the twenty-four hours; and we will

* "Circa collocandos quoque calices observari oportet ut ad lineam ordinentur, nec alterius inferior calix, alterius superior ponatur. Inferior plus trahit."—*Front.* cap. 113.

† Front. *sup.*

probably not err very much if we suppose, that each of the twenty-four streams brought to Imperial Rome, according to the Regionaries, supplied as much as one of the modern, and, therefore, the whole united, would furnish somewhere daily about 1,444,000 cubic metres, or nearly 1,600,000 cubic yards.

The modern Romans have each about one cubic metre daily, most of which is employed for public purposes, and a very small quantity indeed for personal ablutions. If we allow a like quantity to the ancient Romans, it will very closely correspond with the probable number of inhabitants when Rome was in its glory, which, we do not believe, ever exceeded a million and a half. (See Burgess, II. p. 325 and 377).

PUBLIC USES.

Whatever may have been the exact number of cubic feet of water daily introduced, it is quite clear that it far exceeded what could possibly be required for the personal and domestic use of the inhabitants, and we know that a large portion of it was appropriated to the service of public places of recreation.

These uses were either temporary or permanent.

For mere temporary purposes large supplies were occasionally required on the days of public exhibitions for the euripi of the circuses — for laying the dust of the arenæ — and still larger when a circus was converted for a time into a naumachia.

It does not appear that any arrangement was made to accumulate a supply at the fountain-heads, or elsewhere outside the city, for such occasions, but that it was simply drawn from the castella, or from the aqueducts themselves,

and hence we find stringent regulations to prevent inconvénience to the inhabitants.

The euripus of a circus was a deep and wide open ditch, separating the arena from the front seats of the cavea. It seems to have been a common, but not an invariable part of the arrangement. It was first added to the Circus Maximus by Julius Cæsar, and the principal object of it was to keep the wild beasts, the gladiators, or the horses in the chariot races, at a safe distance from the spectators. The name is said to be derived from that of the narrow channel which separated the island of Eubœa from the mainland of Greece.

The euripus of the Circus Maximus must have measured from 1200 to 1400 yards, as it extended along both sides, and one end of the area. It was 9 feet deep, and 9 feet wide, and would require upwards of 30,000 cubic yards of water to fill it. Even on the days of the Circensian games, it was not permitted to water it without having obtained permission from the Ædiles or Censors.* No small quantity of water would be required to keep down the dust on occasion of the great public games, or of long continued fights of gladiators.

The excavations of the French, in the early part of this century, brought to view very extensive substructions occupying the whole arena of the Colosseum, and one theory regarding them is, that they were for the purpose of laying it under water, and afterwards drawing it off, but there is no mention of its being used as a naumachia, except once by Domitian,† and even that is not very explicit. It is more likely that they were for the purpose of making the arena perfectly dry, the site being naturally damp, surrounded on

* "Circus Maximus ne diebus quidem ludorum Circensium, nisi Ædilium aut Censorum permissû irrigabatur."—*Front.* cap. 97.

† "At in amphitheatro navale quoque."—*Sueton. in Domit.* c. iv.

all sides by hills, and having been at one time, perhaps, occupied by the fish-ponds of Nero.

The modern Piazza Navona is the area of an ancient circus, probably the Circus Agonatis or Circus Alexandri, and it is perhaps a relic of ancient customs, that in the month of August every year it is laid under water from midday till sunset, through which the modern Romans wade, or drive in carriages, greatly enjoying the refreshing coolness.*

The naumachiæ, however, were usually exhibited in temporary excavations made for the purpose, and levelled up again after the exhibition; and these were filled sometimes from the Tiber.† Augustus gave one near the spot where his mausoleum was afterwards erected, employing, apparently, the water of the Tiber to fill it.‡ But the permanent naumachia was on the opposite side of the Tiber, and was supplied by the Aqua Alsietina, constructed for the purpose.‖ The naumachiæ and euripi therefore made only occasional demands on the supply of water introduced by the aqueducts.

BATHS — THERMÆ.

The great and constant demand for water for public use was to supply the baths.

* Nibby Roma, p. 472.

† "Repleto et complanato lacu in quo naumachiæ spectaculum ediderat."—*Suet. Tul. Cæs.* cap. 44.

‡ "Navale prælium circa Tiberium, cavalo solo, in quo nunc Cæsarum nemur est."—*Suet. in Oct.* cap. 43.

‖ "Alsietinæ ductus post naumachiam, cujus causâ videtur esse factus, finitur."—*Front.* cap. 22.

These establishments form a very marked peculiarity in the social arrangements of the Romans. Nothing at all resembling them is known to have existed in any other nation, in point of extent, of luxuriousness, or of injurious effects, upon all ranks of the people.

In some respects, the modern clubs of our great cities bear a very slight resemblance to the Roman baths.

Both are places of resort where men may congregate and enjoy every luxury apart from their wives and families, but here the resemblance ceases, and the modern club, with all its comforts, does not offer the high intellectual, nor even the physical resources of the Roman bath, and happily for us, it affords neither the enervating luxury, nor the vicious indulgences, which were there to be found at every hour of the day or night.

If the gradual progress of the system of baths in Rome could be distinctly narrated, it would, we doubt not, very closely approach to an accurate history of the progress of public luxury and demoralization.

During the early republic, baths, like most other things, were simple — for health, and not for splendour and indulgence.

Seneca tells us (Epist. 86), that the ancient Romans washed their legs and arms daily, and bathed the whole body once a week; but, towards the close of the Republic, luxury gradually advanced. Scipio Africanus had a warm bath in his villa at Linternum, and the remains of that of Cicero may still be seen at his Formian villa.

The vapour bath was invented by Sergius Orata, a contemporary of Crassus about A.R. 700.* Cicero repeatedly

* "Sergius Orata —— qui primus pensiles invenit balineas."—*Plin. Hist. Nat.* ix. 54.

alludes to baths. In an epistle to his brother, Quintus III. 1. 1, he enters into various details of one then constructing for his brother's villa at Arpinum, and tells that he had ordered the hot air bath to be removed from one corner to another, because it was too near the bed-rooms.* From his oration Pro Cælio, we learn that public baths, Balneæ Xeniæ, then existed in Rome — open to any one for a moderate payment. †

Soon after this, the practice of luxurious bathing was carried all at once to a great extent by Agrippa, who built the first great Thermæ in his own gardens, about the year of Rome 727, or thirty years before our era. He appears to have admitted the public very freely to the use of them, and on his death bequeathed them to his father-in-law, Augustus, by whom they were presented to the Roman people.

We have already noticed that Agrippa was præfectus aquarum, and this, very possibly, may have led to the erection of the baths.

It was a very popular act, and was but too often imitated in the succeeding years of Rome.

Ruined fragments of Agrippa's baths may be traced in the Via della Ciambella, in the Academia di Teologia, in the Piazza Minerva, and in the Sacristy behind Sa. Maria della Rotonda. The noblest of all the remains of ancient Rome, the Pantheon, was, without doubt, originally built as a portion of these baths; it is proved by the contiguity of the other fragments, and by the identity of the style of the brick-work. It was turned into a temple by Agrippa himself, on which occasion he added the portico, of sixteen

* "In Balucariis assa in alterum apodyterii angulum promovi, propterea quod ita erant posita, ut eorum vaporarium ex quo ignis erumpit, esset subjectum cubiculis."—*Epist. ad Q. Fratrem.* iii. 1. 1.

† Pro Cælio, cap. 25, § 26.

Corinthian columns of granite, each of one stone, 50 feet 9 inches in length, and 5 feet 9 inches in diameter. Thirteen of them remain as originally placed, the three on the east side are modern restorations.

The decorations of the internal chapels and altars probably stand now as they were erected by Agrippa. The present pavement was laid down by Septimius Severus, A. D. 252. The whole edifice stood entire in A. D. 354, when it attracted the special admiration of the Emperor Constans. In 391 it was closed along with the other heathen temples, and in 608 the Emperor Phocas made a present of it to Pope Boniface IV., who consecrated it as a Christian church, to which we probably owe its preservation, though it did not prove sufficient to protect it from the spoliations of the Emperor Constans II., who in A. D. 663 carried off the bronze tiles of the roof, nor of the Pope, Urban VIII., who carried off the bronze beams of the portico to form the Baldacchino of St Peter's, and, what is more to be regretted, disfigured the Pantheon itself by his two detestable belfries.

On the pediment is the simple inscription —

M. AGRIPPA. L. F. COS. TERTIVM. FECIT.

No other ruin in Rome impresses one so strongly with the idea of what the magnificence of the imperial baths must have been. This, independent of the portico, the finest specimen of Roman architecture, not equalled by anything ancient or modern now existing, was originally but one apartment, perhaps the entrance hall, of the oldest public baths erected in Rome.

We learn from Pliny, that Agrippa adorned his baths with much splendour, and he particularly notices a bronze statue of a youth, by Lysippus, which Tiberius admired so greatly, that he removed it to his own dwelling, but was

constrained by popular feeling to restore it.* They were also ornamented by encaustic tiles,† and by certain celebrated caryatides in bronze, the position of which is very uncertain. The internal diameter is 161 feet 10 inches, and the height 140 feet. The thickness of the walls is 23 feet 4 inches. The vault is of plaster, formed into five rows of deep modillions; the projecting cornice is also of plaster, but all below it is of marble. But we must not enlarge on the Pantheon. It belongs rather to the temples than to the baths of Rome.

There is much sameness in the plans of the various ancient thermæ. The essential parts were — the calidarium, tepidarium, and frigidarium; or, hot, tepid, and cold baths. These, variously arranged, and with the necessary adjuncts, formed the corpus internum; to which, in the imperial baths, was added a corpus externum, containing many other buildings for various purposes, and enclosing a vast extent of ground.

We do not purpose to enter upon the *details* of these arrangements, nor upon the means employed for heating and ventilation. These are subjects of much interest, but they have already been brought most ably and completely before the Institute, in a paper read by Mr Ritchie, in March 1851.

We find in the regionaries the names of no less than sixteen thermæ, and antiquaries profess to point out the remains of most of them. Three of great extent still remain in such a state as to enable us at least to judge of their size — those of Titus, of Caracalla (which were specially illustrated by Mr Ritchie), and those of Diocletian, the ruins of which are more than a mile in circumference. It is

* Plin. Nat. Hist. xxxiv. 8.

† "Agrippa certe in thermis quas Romæ fecit, figlinum opus encausto pinxit."

asserted that those of Constantine were still more extensive; but no certain portion of them remains. Sixteen hundred marble chairs for bathers were placed in those of Caracalla, and three thousand two hundred in Diocletian's. These, however, were only for a portion of the bathers. Besides the occupants of the chairs, thousands must have thronged the hot, tepid, and cold reservoirs. Many of these marble chairs still exist in the museums and churches of Italy.

The baths of Caracalla accommodated the inhabitants of the Aventine and Celian, those of Titus the Esquiline, those of Agrippa the Campus Martius, and Diocletian's the Quirinal and Viminal. The bathing habits of the latter Romans must have given full employment to all the sixteen establishments, for they were not content with one bath a day; many must have spent most of their time in the water. The infamous Commodus bathed seven or eight times a day, and took his meals in the bath.* The virtuous Gordian bathed four or five times in summer, and twice in winter†, and the profligate Gallienus six or seven times in summer, and twice or thrice in winter.‡

Men and women alike frequented the baths, and, under the empire for a long period, bathed promiscuously together.

Pliny alludes to this, speaking of the silver lining of the baths;‖ and nothing could more clearly prove the utter demoralization of the people. Several of the wiser and more

* "Lavavat per diem septies et octies, et in ipsis balneis edebat."—*Lamprid. Vita Com.* c. xi.

† "Vini parcus, cibi parcissimus, vestitû nitidus, lavandi cupidus ita ut et quater et quinquies in die lavaret æstate, in hieme bis."—*Jul. Capitol. Gordiani Tres.* cap. 6.

‡ "Lavit ad diem septimo æstate, vel sexto, hieme secundo vel tertio."—*Trebell. Pollio Gallieni duo,* cap. xvii.

‖ "Et stratas argento mulierem balineas ita ut vestigio locus non sit cum viris lavantium."—*Plin. Hist. Nat.* xxxiii. 12.

respectable emperors endeavoured by laws to put down the abominable practice; but the necessity of successive laws, from time to time, during more than a hundred years, for such a purpose, proves the corruption of the social system. The time was fast approaching when it was necessary for the good of mankind that imperial Rome should perish.

Hadrian separated the bathing places of the two sexes,* and also Marcus Antoninus the Philosopher.† Heliogabalus had countenanced the practice, and Alexander Severus again strictly prohibited it.‡ The distinctions of rank as well as of sex were forgotten in the baths. Emperors and subjects bathed together. Even in the time of Julius Cæsar the mother of Augustus frequented the public baths,‖ and the Emperor Hadrian bathed along with the meanest of his subjects.§ Alexander Severus bathed in common with the people in his own or in the older baths, and walked home to the palace in his bathing dress, having no mark of the imperial dignity save a scarlet cloak.¶ Gallienus refreshed

* "Lavacra pro sexibus separavit." — *Spartianus Hadriani Vita*, c. 18. About A.U.C. 887 — A.D. 135.

† "Lavacra mixta submovit." — *Capitolinus Vita M. Antonin.* c. 23. U.C. 928 — A.D. 176.

‡ "Balnea mixta Romæ exhiberi prohibent, quod quidem jam ante prohibitum, Heliogabalus fieri permiserat." — *Lamprid. Vita Alexandri Severi*, c. 24. About A.U.C. 980 — A. D. 228.

‖ "Adeo ut mox publicis balineis perpetuo (Atia) abstinuerit." — *Suet. Vita Aug.* c. 94.

§ "Publice et frequenter et cum omnibus lavit." — *Ælii Spart. Vit. Hadr.* cap. xvii.

¶ "Thermis et suis et veterum frequenter cum populo usus est, et æstate maxime; balneari veste ad palatium revertens; hoc solum imperatorium habens quod lacernam coccineam accipiebat." — *Lamprid. Alexander Severus*, cap. 42.

not himself only, but all his great officers of state, by taking a bath * along with them.

But enough of this distasteful subject. These few facts from ancient writers amply prove the degrading influence which the baths exercised on the ancient Romans. Ammianus Marcellinus compares the baths to provinces; and, when we contemplate the ruins yet remaining, we cannot much condemn the expression.

The ruins of the Baths of Caracalla, already described to the Institute by Mr Ritchie, are the finest, but those of Dioclesian, though inferior in execution, are greatly more extensive, and in some portions their ruins are more imposing.

One of the great halls of their corpus internum was converted by Michael Angelo into the Church of Sta. Maria degli Angeli, in the form of a Greek cross, and, in point of architecture and effect, it is superior even to St. Peter's, though much inferior in actual dimensions.

This church is adorned by eight magnificent columns of red granite, which still occupy their original positions in one of the halls of the baths, but the bases on which they seem to rest are modern additions — the actual bases are several feet below — and the necessary raising of the floor has greatly injured the proportions of the columns. Some of the finest pillars of modern Rome were obtained from these ruins, as those of Verde Antico, now in San Giovanni. Part of the building is occupied by hay lofts, the vaulted roofs still remaining, and a portion has been turned into a poorhouse, and one of the corner towers of the corpus externum is now the church of San Bernardo. It is said that

* "Ibant et præfecti et magistri officiorum omnium . . . lavabant etiam simul cum principe."—*Tribell. Pollio Gallieni duo*, cap. 17. "Admittebantur sæpe etiam mulieres, cum ipso pulchræ et puellæ, cum illis, anus deformes."—*Ibid.* (About A.U.C. 1020 — A.D. 268.)

many thousand persecuted Christians were employed on the building by Diocletian. A plan of them is given in Plate XVIII.

QUALITY OF WATER.

The water brought by the aqueducts to Rome was of different qualities.

The Marcian was the finest, and Pliny speaks of it as the special gift of the gods to Rome, and as the coldest and finest in the whole world — "Clarissima aquarum omnium toto orbe frigoris salubritatisque palma, præconio urbis, Marcia est, inter reliqua Deorum munera urbi tributa." *

Martial describes its perfect purity —

> "Martiaque
> Quæ tam candida tam serena lucet,
> Ut nullas ibi suspiceris undas,
> Et credas vacuam nitĕre Lygdon." †

It was peculiarly valued for drinking — either pure, or mixed with old wine — "Temperet annosum Marciâ lymphâ merum," is the advice of Tibullus. ‡

The Aqua Virginis was as much esteemed for bathing purposes, as the Marcian for drinking — "Quantum Virginea tactu, tantam præstat Marcia haustu." ||

One stream, the Aqua Crabra, was introduced along with the Julia by Augustus, and afterwards expelled on account of its inferior quality, and hence it obtained the name of "Aqua damnata," though Frontinus § suggests that it was rather abandoned for the convenience of the inhabitants of the Tusculan territory than on account of its inferior

* Hist. Nat. xxxi. 2. † Martial, Epigr. vi. 42.
‡ Eleg. iii. 7. || Pliny, Hist. Nat. xxxi. 3. § Cap. 9.

quality. It is supposed to be represented by the modern Aqua Marrana, a filthy little stream, which enters Rome near the Porta San Giovanni.

LAWS REGARDING WATER AND AQUEDUCTS.

Supplies of water in Rome were obtained by private individuals only by special grants from the emperor — and these were purely personal — they were not conceded to the dwelling, but to the individual, and they did not pass to heirs or purchasers; a fresh grant must be obtained.* Even the surplus water, which flowed over from the basins of the Castella, could only be obtained by similar grant;† and a good reason is given — that this water was required for the salubrity of the city, by cleansing the drains. ‡

It would be well for our large towns if this principle were fully adopted, and ample supplies of pure water poured constantly along the sewers.

It was a serious offence in ancient Rome to commit any act by which water for public use was polluted. The penalty for so doing was a fine of 10,000 sestercii — equal to about £84 sterling,‖ and a curious inscription still remaining on the walls of one of the substructions, probably a reservoir, of

* "Jus imperatæ aquæ neque heredem, neque emptorem neque ullum novum dominum prædiorum sequitur."—*Front.* c. 107.

† "Caducam neminem volo ducere nisi qui meo beneficio aut priorum principum habeat."—*Front.* c. 111.

‡ "Nam necesse est ex castellis aliquam partem aquæ effluere, cum hoc pertineat non solum ad urbis nostræ salubritatem sed etiam ad utilitatem cloacarum abluendarum."—*Front.* cap. 111.

‖ "Ne quis aquam oletato dolo malo ubi publice saliet. Si quis oletarit sestertiorum decem millia multa esto."—*Front.* cap. 97.

the baths of Titus, invokes the vengeance of Diana and of Jupiter O'. M., and the twelve great gods and goddesses on whoever dared pollute the spot. No one was permitted to draw off water without permission, nor a larger quantity than what had been granted to him.

Frontinus, on entering office, found that there was much waste, and much fraudulent abstraction — "Magna cura multiplici opponenda fraudi est."* It was forbidden to plant trees within 15 feet of the specus, or erect buildings within 5 feet.†

One law shows a partial acquaintance with the hydraulic principle, that if a pipe be widened at its delivering end, a larger quantity of water will flow from it than if it were of one uniform width throughout. The Romans held this to be true only if the pipe were of no great length, and therefore forbade‡ to attach a wider pipe within 50 feet of the Castellum.

The two great prevalent frauds were by householders tapping the pipes which passed along the adjoining streets, by which a supply could be obtained, and not easily detected,‖ and by bribing the aquarius to deliver a larger quantity into a private pipe than was justly due, or by the aquarius himself opening new supplies, granted legally, but omitting to shut up those which had ceased, and thus obtain-

* Front. c. 103.

† "Aquarum quæ in urbem venirent itimera occupari monumentis et ædificiis, et arboribus conseri . . . . utrâque ex parte vacuos quinos denos pedes patere . . . . et ædificia utraque ex parte quinos pedes vacuos relinqui."—*Front.* cap. 127.

‡ "Intra quinquaginta pedes ejus Castelli ex quo aquam ducunt laxiorem fistulam subjicere."—*Front.* c. 106.

‖ "Longa ac diversa sunt spatia, per quæ fistulæ totâ meant urbe, latentes sub silice."—*Front.* c. 115.

ing water which he himself could dispose of without accounting for the proceeds,* and against them the Præfectus Aquarum required to direct his ceaseless vigilance. Works so extensive and costly as those connected with the supply of water to Rome, required much constant and minute superintendence, and very large bodies of men were employed for the purpose.

At the head of them, in imperial times, was the Præfectus Aquarum, the office held by Frontinus; but the general system was arranged at an earlier period. Agrippa, after his ædileship and consulship, appears as "Curator aquarum perpetuus," and made up an account of the quantities of water delivered to public works, to lacus, and to private individuals.† The work connected with the aqueducts, castella and lacus, was performed by his "familia," who were evidently slaves; for, on his death, he bequeathed them to Augustus, by whom they, along with the rest of the inheritance he derived from Agrippa, were presented to the people of Rome. After this it became a department of the state service, regulated by senatus consulta, rescripts, and legal decisions.

When the præfectus was out of the city on duty, he was attended by two lictors, besides architects, scribes, ushers, and criers, and within the city by the same officers except the lictors.‡ The care of the aqueducts, and of every thing connected with them, was one of the duties carefully performed even by the worst emperors, down to the latest periods. The expenses were defrayed by the produce of

* "Adhuc illa aquariorum intolerabilis fraus est, translatâ in novum possessorem aqua, foramen novum Castello imponunt, vetus relinquunt, quo venalem extrahunt aquam."—*Front.* c. 114.

† Front. c. 98.

‡ Front. c. 100.

the water tax, and by occasional grants from the senate, especially when extensive repairs or new works were required; but the latter were usually defrayed, at least nominally, by the emperors, as a sure means of acquiring popularity.

MODERN SUPPLY.

Modern Rome is better supplied with water than any other city in Europe — the quantity introduced being very large, and of excellent quality. Indeed, but for its abundance and salubrity, Rome would be nearly uninhabitable at the present day. Three aqueducts bring in to Rome the Aqua Vergine, Felice, and Paola. The Aqua Vergine is a restoration, by several popes, of the ancient supply of the same name. It enters the city near the Muro Torto, proceeds along the side of the Pincian Hill, and supplies the Fontana di Trevi and a great part of modern Rome. One portion of it is delivered at the Chiavico del Bufalo, already noticed.

The Aqua Felice was introduced by the indefatigable pontiff Sextus V. Fabretti devotes to it one of his dissertations, and endeavours to show that it is fed by the fountains which supplied the ancient Alexandrine. Its sources are near Colonna, 16 miles from Rome, and in constructing it the pope made use alike of restored portions of ancient aqueducts and the materials of other parts, as suited his purpose.

It enters Rome near the Amfiteatro Castrense, proceeds on the ancient Claudian arches, embodied in the city wall, to the Porta Maggiore and Porta San Lorenzo, whence it turns into the city. At this point it is about 160 feet above the level of the Tiber at the Ripetta, and therefore can supply the highest parts of the Seven Hills. It furnishes water to

the great fountains of the Quattro Fontane and the greater part of the Quirinal, Viminal, and Esquiline Hills, the Capitol, and the Forum. The water is good, but not equal to that of the Vergine.

It has its name, "Felice," from Felice Peretti, the conventual name of Sixtus, before his elevation to the popedom. It is believed to be supplied by the fountains which fed the Marcian and Claudian, and was constructed by the architect Fontana; and its rapid erection was one specimen of the determined energy of the pope. From two to four thousand men were employed at the work.

The third is the Aqua Paola, by far the most copious, introduced by Pope Paul V. (Borghese) from the Lago Sabatino and adjoining springs — almost wholly in the specus of the ancient Alsietina. It enters the city near the Porta San Pancrazio, at a height of about 200 feet above the level of the Tiber. As the ancient Alsietina was devoted to the naumachiæ, so the modern Paola is mostly devoted to fountains. It supplies the great Fontana Paola, those of the Piazza San Pietro, the Vatican Gardens, and the whole of the district of Trastevere.

The quantity of water delivered by it is estimated at 94,000 cubic metres, or nearly one million of cubic feet in the 24 hours, which is rather more than double the quantity brought by the Aqua Vergine and Aqua Felice together.*

CLOACÆ.

The system of drains in Rome was not less complete than that of aqueducts; but, from the nature of the works, only a

* Melchiorri, p. 143.

small amount of information respecting them can be given. Buried originally beneath the streets and houses, they are now interred five times over beneath the accumulated ruins of sixteen centuries.

Every one has heard of the Cloaca Maxima. Livy tells us that Tarquin the Elder constructed drains to dry the lower part of the Forum.* This points distinctly to a regular system of drains betwixt the Capitoline, Palatine, and Quirinal Hills, meeting in the Forum, and flowing by one main to the Tiber. But the Cloaca Maxima, from the Forum to the Tiber, is attributed to Tarquin the Proud, † and it is possible, that as the Viminal, Esquiline, and Quirinal Hills had been added to Rome betwixt the days of Tarquinus Priscus and those of Tarquinius Superbus, new drains had been formed in the valleys which separated them, and that the larger quantity of water thus brought necessitated the building of a larger main, and hence the Cloaca Maxima.

But it is a very perplexing subject. It stands, from the Tiber up to San Georgio in Velabro, entire as when it was constructed, and to this day performs the duty of a drain. But was it really built for the purpose? Could the Tarquins have ever dreamt of Rome requiring such an outlet for drainage; or was drainage ever thought of in those days? The authorities of Livy and of Dionysius Halicarnassus cannot have much weight, for they can only repeat the popular traditions of their own day six or seven centuries after the alleged fact.

Supposing the Tarquins knew the value of drainage, why

* "Et infima urbis loca circa Forum, aliasque interjectas collibus convalles, quia ex planis locis haud facile evehebant aquas, cloacis è fastigio in Tiberim ductis siccat." — *Liv.* 1. 16.

† "Cloacamque maximam, receptaculum omnium purgamentorum urbis, sub terra agendam," &c. — *Liv.* 1. 21.

construct a culvert large enough to contain the whole inhabitants of their capital?

It has been conjectured that it was built by some unknown people, long prior to the foundation of Rome, and belonged to some mighty city, of which no other trace remains either on the spot or in tradition.

Some think, that if built by Tarquin, it was not so much for the purpose of a drain, as to raise the level of the marshy Velabrum; but why incur such an expense when the city was so limited in population, and abundance of unoccupied dry ground lay all around it?

For whatever purpose, or by whomsoever it was built, it now stands a wonderful monument of durable masonry, and continuing, at all events, for more than twenty centuries, to do the work of a sewer.

Tarquin is said to have employed Etruscan architects to build it; but we are not aware of any known Etruscan remain which is of precisely the same style; perhaps, however, because none other was destined to the same purpose. The Cloaca is in length, from the Velabrum to the Tiber, about a quarter of a mile — 440 yards. It is constructed of three concentric circles of squared stones, put together without cement. The greater part of it is of lithoid tufa, probably from the Tarpeian rock, which it closely resembles in composition and colour — a light brownish-red. It is strengthened by diatoni of Travertine at distances of 12 feet apart. The blocks of tufa and of Travertine are each about 5 feet by 3 feet. It is about 13 feet high and as many wide; but 6 or 7 feet are now filled with mud and water, so that the lower part and the sole cannot be seen.

The arch is semicircular, or very nearly so, and it would be instructive to know whether the lower part is flat, or a reversed arch; if it prove to be the latter it would help to

explain the extraordinary durability of the work, notwithstanding the ceaseless action of water for more than 2000 years, and occasional violent earthquakes. Its position, and perhaps its usefulness, secured it very much from the attacks of man.

There is not much declivity along its course, for a very moderate flood in the Tiber completely covers its mouth, and causes its contents to flow back so as to make it inaccessible at the upper end. Pliny states, that a waggon well loaded with hay could pass along it,* and this is no exaggeration.

The mouth towards the Tiber is formed of three concentric arches of Gabine stone (Peperino di Gabino), and the river at its usual level covers the lower part of the arch, so that the heavy contents of the Cloaca are delivered several feet below the surface of the water. Plate XIX. represents the upper end of the Cloaca, and Plate XX. its mouth at the Tiber.

Additional sewers were constructed by the censors Marcus Cato and Valerius Flaccus, A.U.C. 568, for the use of the Aventine and other districts.†

Between the mouth of the Cloaca Maxima, and the remains of the Sublician bridge, two other ancient mouths of Cloacæ are visible — small semi-circular arches, by one of which the Marrana (Aqua Crabra) now enters the Tiber.

Agrippa, in the reign of Augustus, not only cleansed the cloacæ which already existed, but added many new, so as to make Rome, as Pliny expresses it, be suspended above water, and navigable under ground.‡ Dion. Cassius informs us, in

* "Ut vehem fæni large onustam transmitteret." — *Plin. Hist. Nat.* xxxvi. 15.

† "Cloacas in Aventino et in aliis partibus, qua nondum erant, censores faciendas locaverunt." — *Liv.* xxxix. cap. 44.

‡ "Urbe pensili, subterque navigata."—*Plin.* xxxvi. 15.

addition, that Agrippa sailed along them in a boat to the Tiber — no very enviable expedition. Probably one of those constructed by Agrippa is that which still conveys the water from the Fontana di Trevi across the Campus Martius to the Tiber, near the Ripetta, where it turns a mill wheel.

Various fragments of cloacæ have occasionally been discovered in the course of excavations, but none which give any information of importance.

Though our knowledge of the cloacæ be thus limited and fragmentary, we think we are entitled to conclude, from what is known to exist, that it was every way suitable to the wants of the city, and adequate to the removal of its impurities, as well as of the water introduced by the aqueducts. In some respects, the more water poured through the drains from the aqueducts, the less trouble there would be in keeping them in order, and the more completely would they do their work.

We have thus endeavoured to give to the Institute some idea, though very imperfectly, of the water works of the ancient Romans—their aqueducts, reservoirs, baths, and drains.

It is often impossible to concur in the exaggerated terms in which some ancient writers indulge, when speaking of these and of other great works — but when we dispassionately regard the vastness, the usefulness, and the adaptation of means to the desired end, displayed in bringing water to Rome, and furnishing it to public and private purposes, one can hardly refuse to sympathise with Pliny when he says,* "Quod si quis diligentius æstimaverit aquarum abundantiam in publico, balineis, piscinis, domibus, euripis, hortis, suburbanis, villis, spatioque advenientis extructos arcus, montes perfossos, convalles æquatas, fatebitur nihil magis mirandum fuisse in toto orbe terrarum."

* Plin. Hist. Nat. xxxvi. 15.

APPENDIX.

No. A.

Inscriptions on Ornamental Arch of Aqueducts at Porta Maggiore.

(*Upper compartment — Claudius. About* A.D. 51.)

TI. CLAVDIVS. DRVSI. F. CAISAR. AVGVSTVS GERMANICVS. PONTIF. MAXIM.
TRIBVNICIA. POTESTATE. XII. COS. V. IMPERATOR. XXVII. PATER. PATRIÆ.
AQVAS. CLAVDIAM. EX. FONTIBVS. QVI. VOCABANTVR. CÆRVLEVS. ET. CVRTIVS. A. MILLIARIO. XXXXV.
ITEM. ANIENEM. NOVAM. A. MILLIARIO. LXII. SVA. IMPENSA. IN. VRBEM. PERDVCENDAS. CVRAVIT.

(*Middle compartment — Titus. About* A.D. 71.)

IMP. CÆSAR. VESPASIANVS. AVGVST. PONTIF. MAX. TRIB. POT. II. IMP. VI. COS. III. DESIG. IIII. P. P.
AQVAS. CVRTIAM. ET. CAERVLEAM. PERDVCTAS. A. DIVO CLAVDIO. ET. POSTEA. INTERMISSAS. DILAPSASQVE.
PER. ANNOS NOVEM. SVA. IMPENSA. VRBI. RESTITVIT.

(*Lowest compartment — Vespasian* A.D. 80.)

IMP. T. CAESAR. DIVI. F. VESPASIANVS. AVGVSTVS PONTIFEX. MAXIMVS TRIBVNIC.
POTESTATE. X. IMPERATOR. XVII. PATER. PATRIÆ. CENSOR. COS. VIII.
AQVAS. CVRTIAM. ET CAERVLEAM PERDVCTAS A. DIVO. CLAVDIO. ET. POSTEA.
A. DIVO. VESPASIANO. PATRE. SVO. VRBI. RESTITVTAS. CVM. A. CAPITE. AQVARVM. A. SOLO. VETVSTATE.
DILAPSAE. ESSENT. NOVA. FORMA. REDVCENDAS. SVA. IMPENSA. CVRAVIT.

No. B.

Inscriptions on Marcian Aqueduct at Porta San Lorenzo.

(*Upper compartment — Titus.* A.D. 80.)

IMP. TITVS. CÆSAR. DIVI. F. VESPASIANVS AVG. PONTIF. MAX.
TRIBVNICIÆ. POTESTAT. IX. IMP. XV. CENS. COS. VII. DESIGN. VIII.
RIVOM. AQVÆ. MARCIÆ. VETVSTATE. DILAPSVM. REFECIT ET. AQVAM. QVÆ. IN. VSV. ESSE. DESIERAT. REDVXIT.

(*Middle compartment — Caracalla. About* A.D. 170.)

IMP. CÆS. M. AVRELIVS. ANTONINVS. PIVS. FELIX AVG. PARTH. MAX.
BRIT. MAXIMVS. PONTIFEX. MAXIMVS. AQVAM. MARCIAM. VARIIS. KASIBVS. IMPEDITAM. PVRGATO.
FONTE. EXCISIS. ET. PERFORATIS. MONTIBVS. RESTITVTA. FORMA. ADQVISITO. ETIAM.
FONTE. NOVO. ANTONINIANO. IN. SACRAM. VRBEM. SVAM. PERDVCENDAM. CVRAVIT.

(*Lowest compartment — Augustus. About* B.C. 20.)

IMP. CÆS. DIVI. IVLI. F. AVGVSTVS. PONTIFEX. MAXIMVS. COS. XII.
TRIBVNIC. POTESTAT. XIX. IMP. XIIII. RIVOS. AQVARVM. OMNIVM. REFECIT.

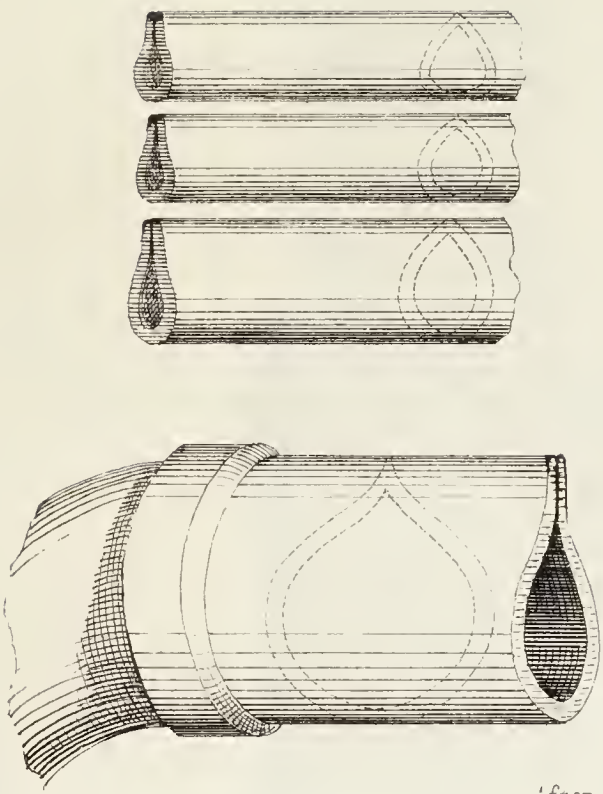
No. C.

Inscription on supposed Castellum of Aqua Virginis in Cortile Del Bufalo.

(*About* A.D. 42.)

TI. CLAVDIVS. DRVSI. F. AVG. GERMAN. PONT. MAX. TRIBVNIC. POT. V. IMP. IX.
P. P. COS. III. ARCVS. DVCTVS. AQVÆ. VIRGINIS. DISTVRBATOS. PER. C. CÆSAREM.
A. FVNDAMENTIS. NOVOS. FECIT. AC. RESTITVIT.

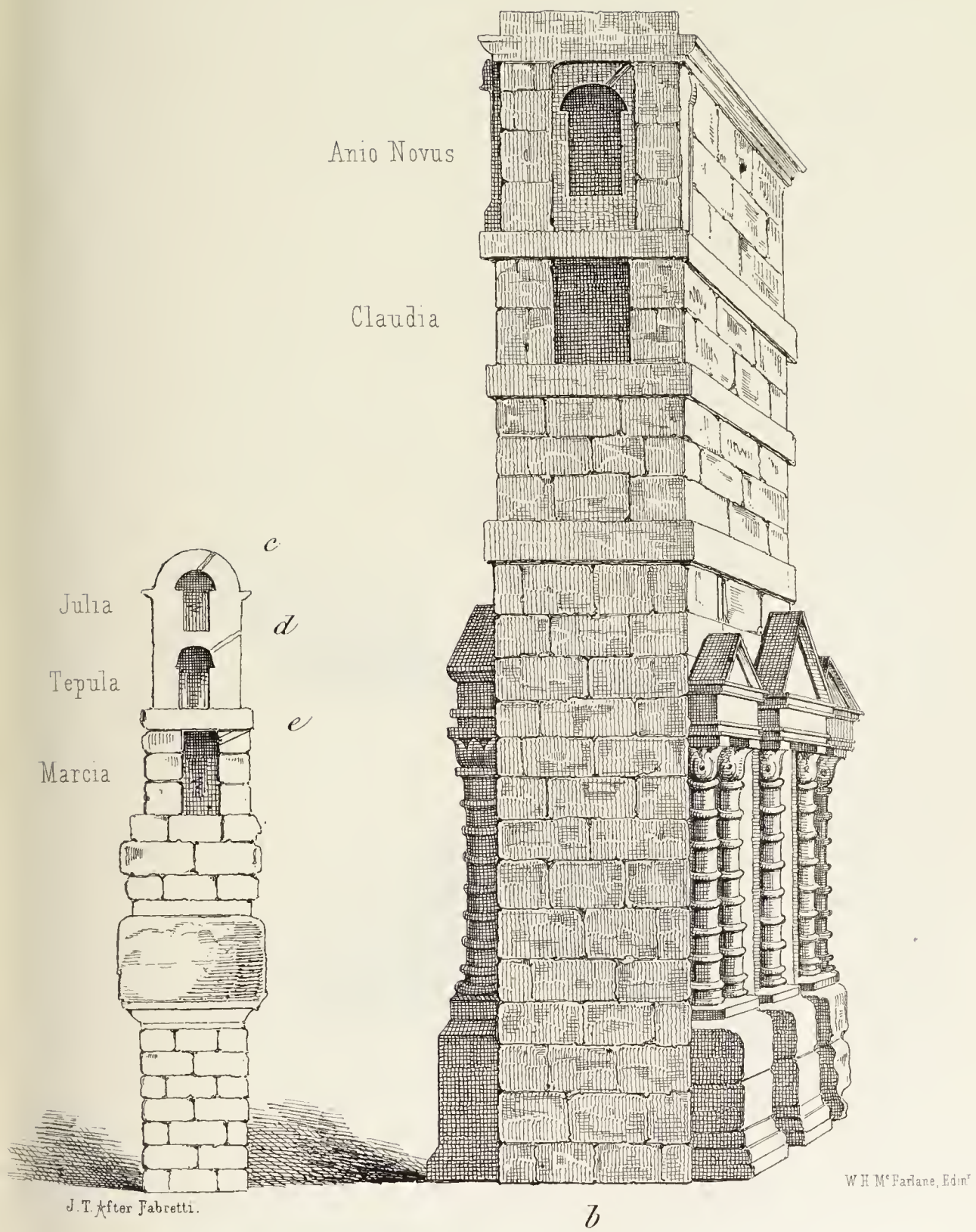
N° I



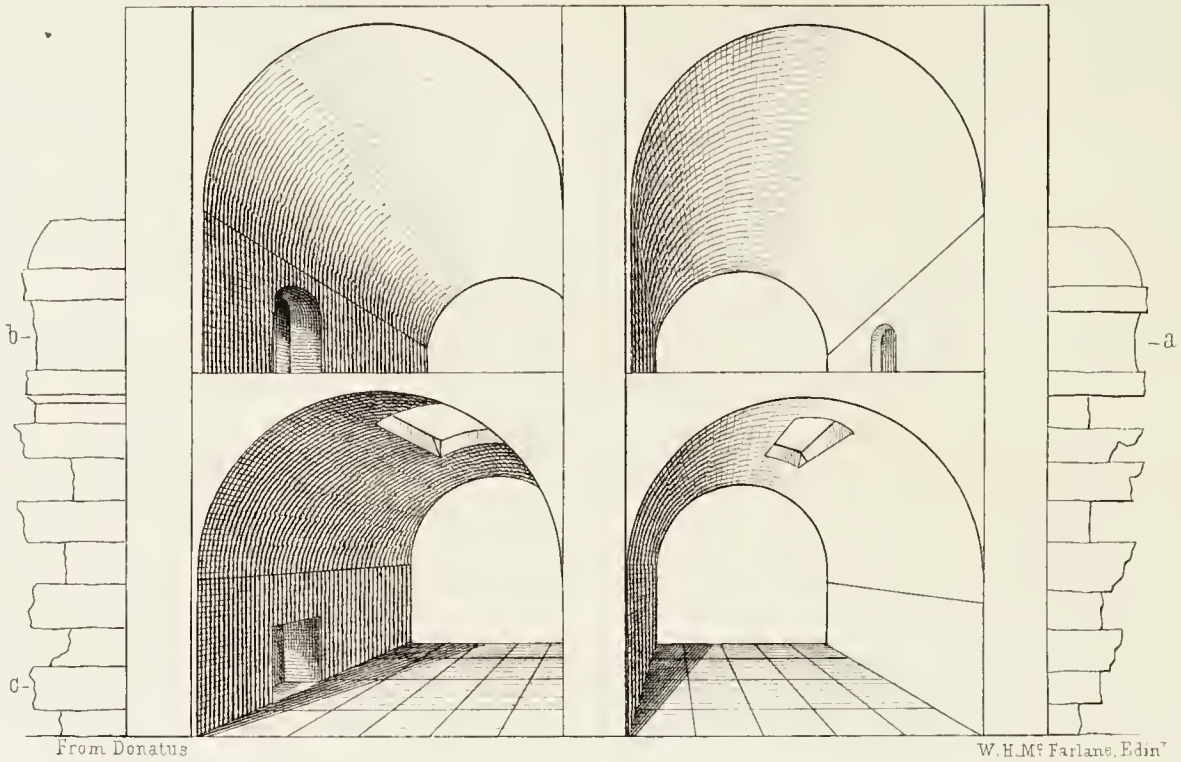
After Donatus

Roman Leaden Water Pipes.

Nº II.



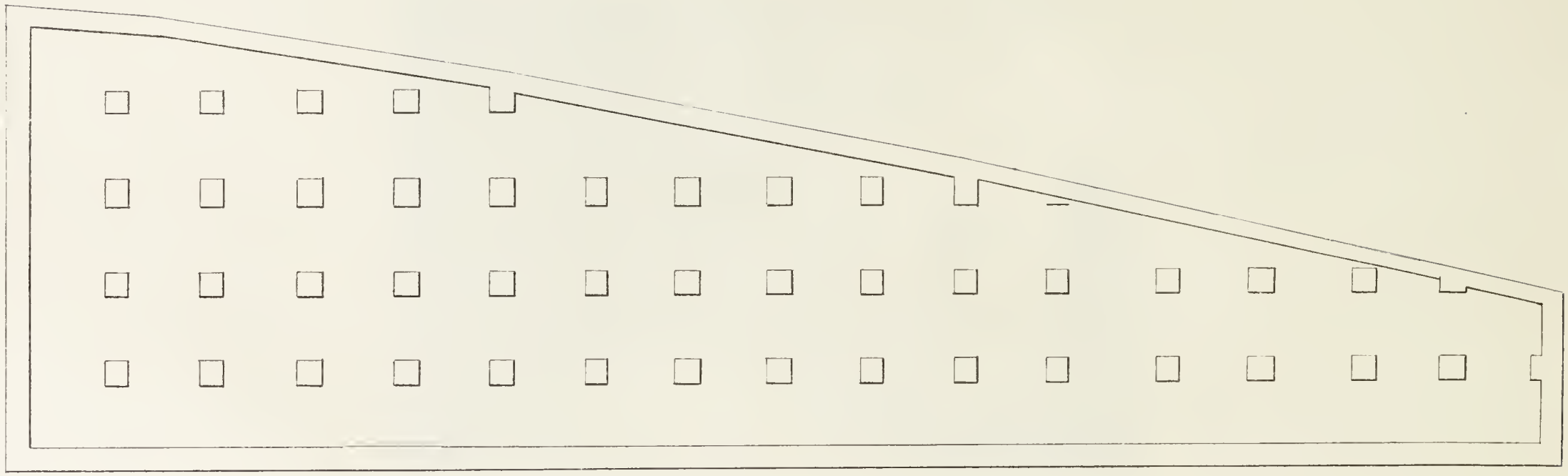
a Section of Aqueducts Julia, Tepula & Marcia.
b " " Anio Novus & Claudia.
c, d, e, Air holes or Ventilators.



Section of Piscina in two floors.

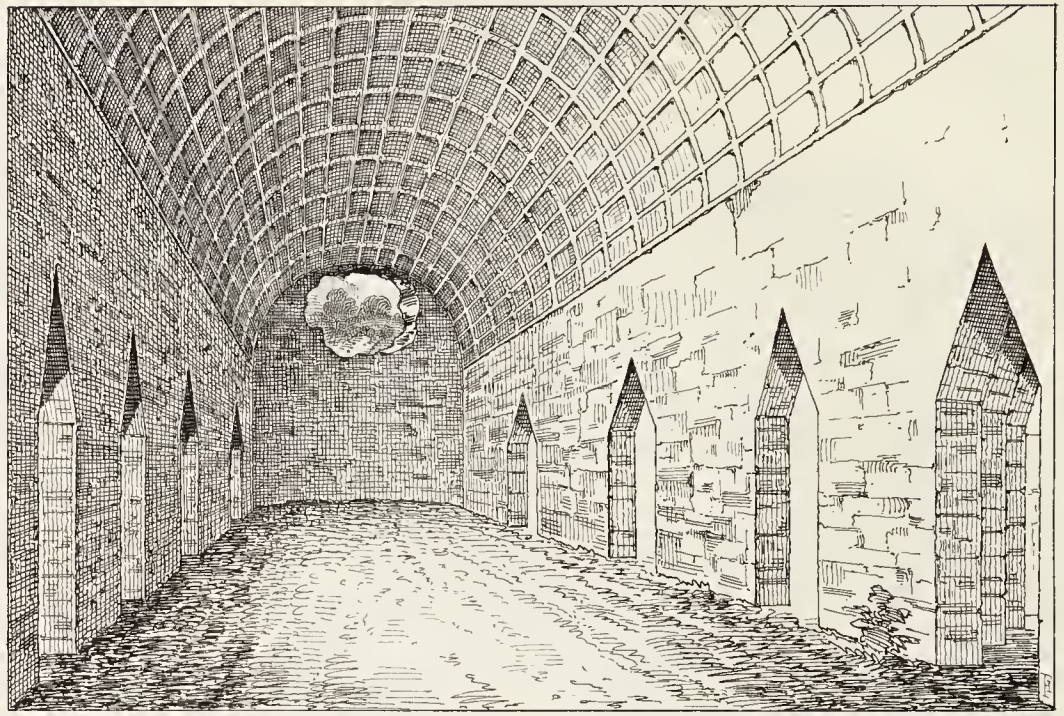
a, Specus delivering water from source. — b. specus carrying off pure water
c, Entrance for occasional removal of deposited mud

N° IV



Ground Plan of Piscina of Baths of Diocletian.

From Marliani Topographia - p. 220.

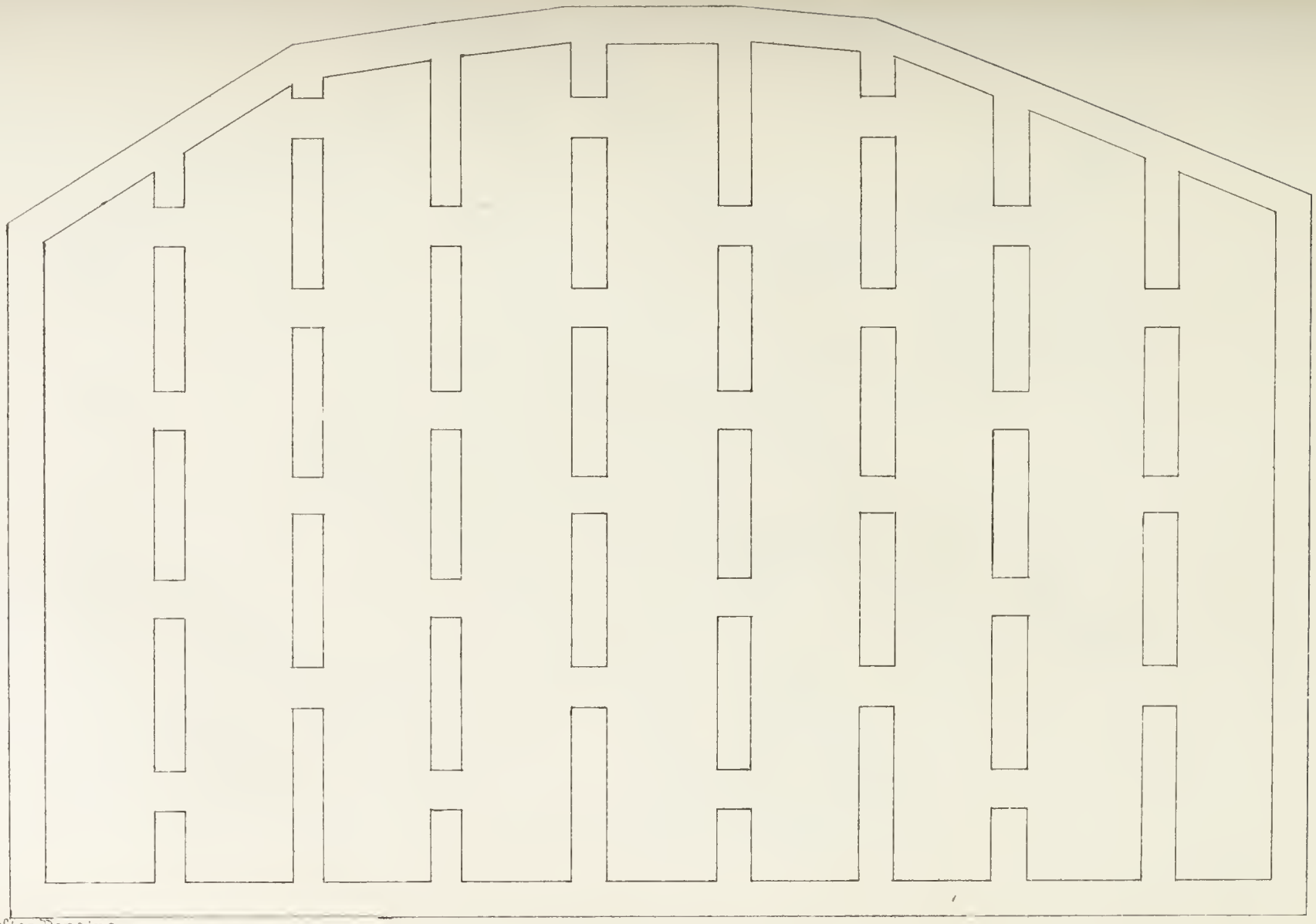


After Cipriani

W H Mc Farlane, Edinr

One of the Apartments of Sette Sale.

Pointed Arch of Aqueduct at Tusculum.



After Donatus.

Ground Plan of Sette Sale.

After Nibby

W. H. McFarlane 19, St James Sq. Edinr

Course of Aqueducts, Anio Vetus, Anio Novus, Claudia, & Marcia near Tivoli.
Aquæductus Trajani – a local work for use of Villa Adriana

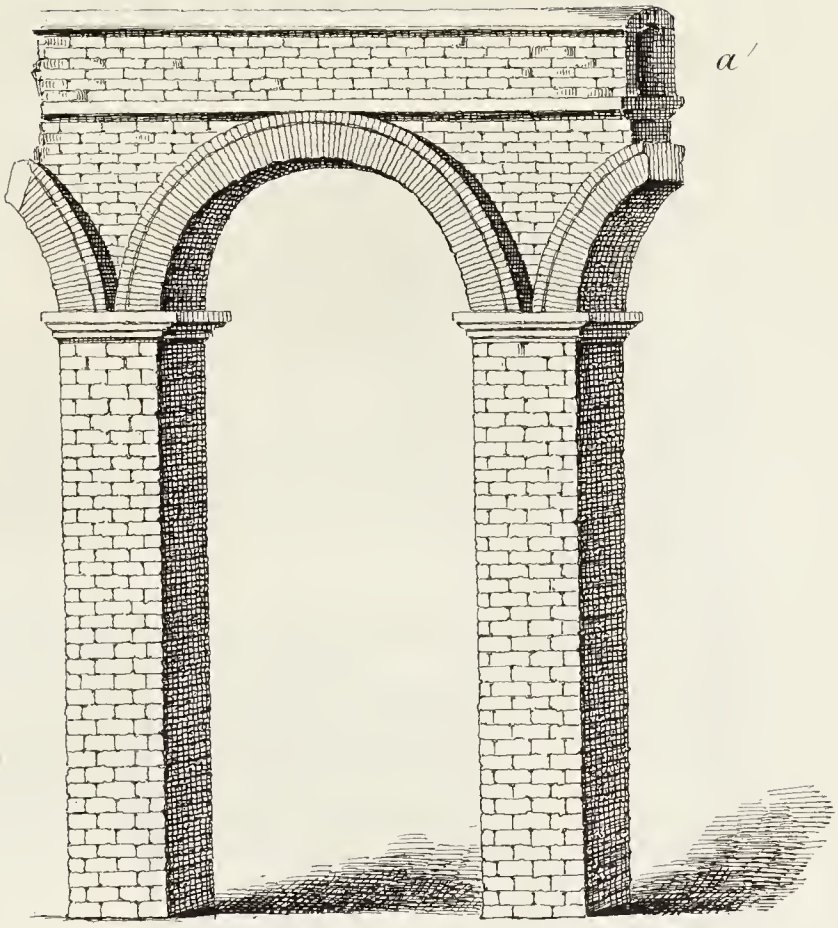
N° IX.

J. T. After Fabretti

Arch of Claudian Aqueduct of opus quadratum.

a. Specus.

N° X.



J. T After Fabretti.

Arch of Nero's Aqueduct of brick laterizia.

a. Specus

Arch of Drusus employed to convey specus of Antonine Branch Aqueduct to Baths of Caracalla.

a. the Specus.

After Rossini.

W H M'Farlane, 19 St James Sq Edinr

Monumentum Aquæ Claudiæ at Porta Maggiore.

Restoration of ornamental archus conveying Anio Novus and Claudian Aqueducts over Via Prænestina & Via Labicana.

a. Prænestina _ b. Labicana.

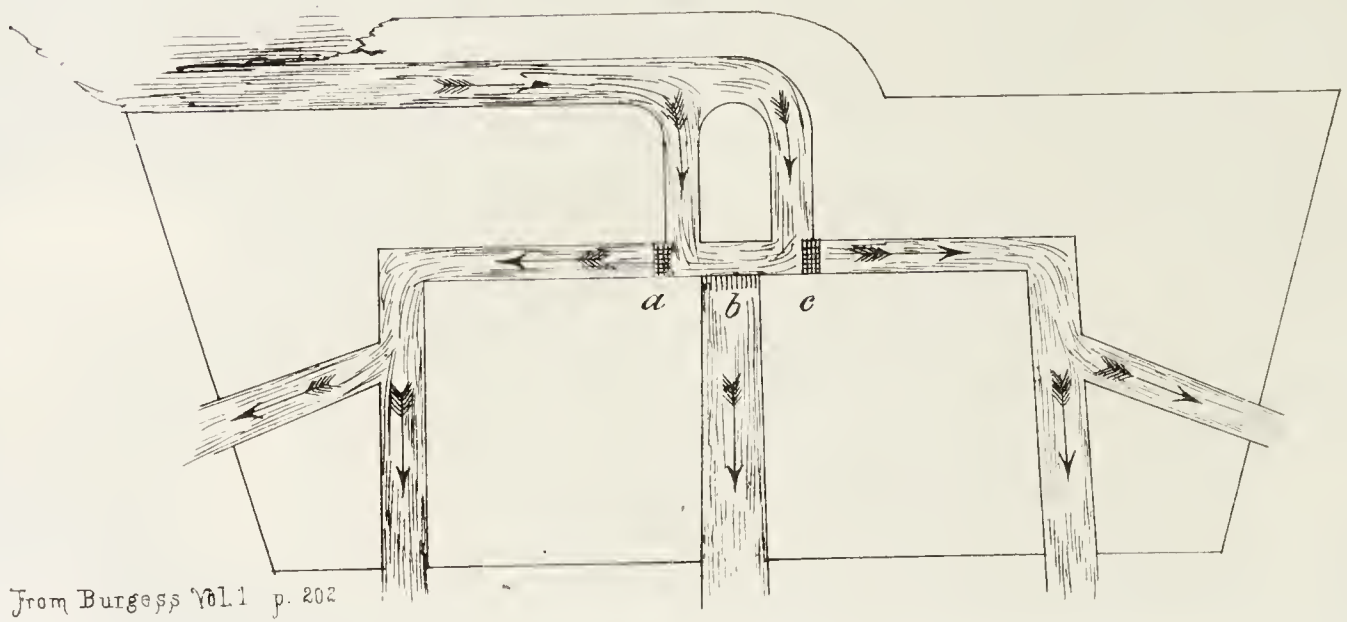
Nº XIV.

Del. Yospin.

W. H. Mc Farlane, 19 St James Sq. Edinr.

Monumentum of Marcia, Tepula & Julia at Porta San Lorenzo.

N° XV.

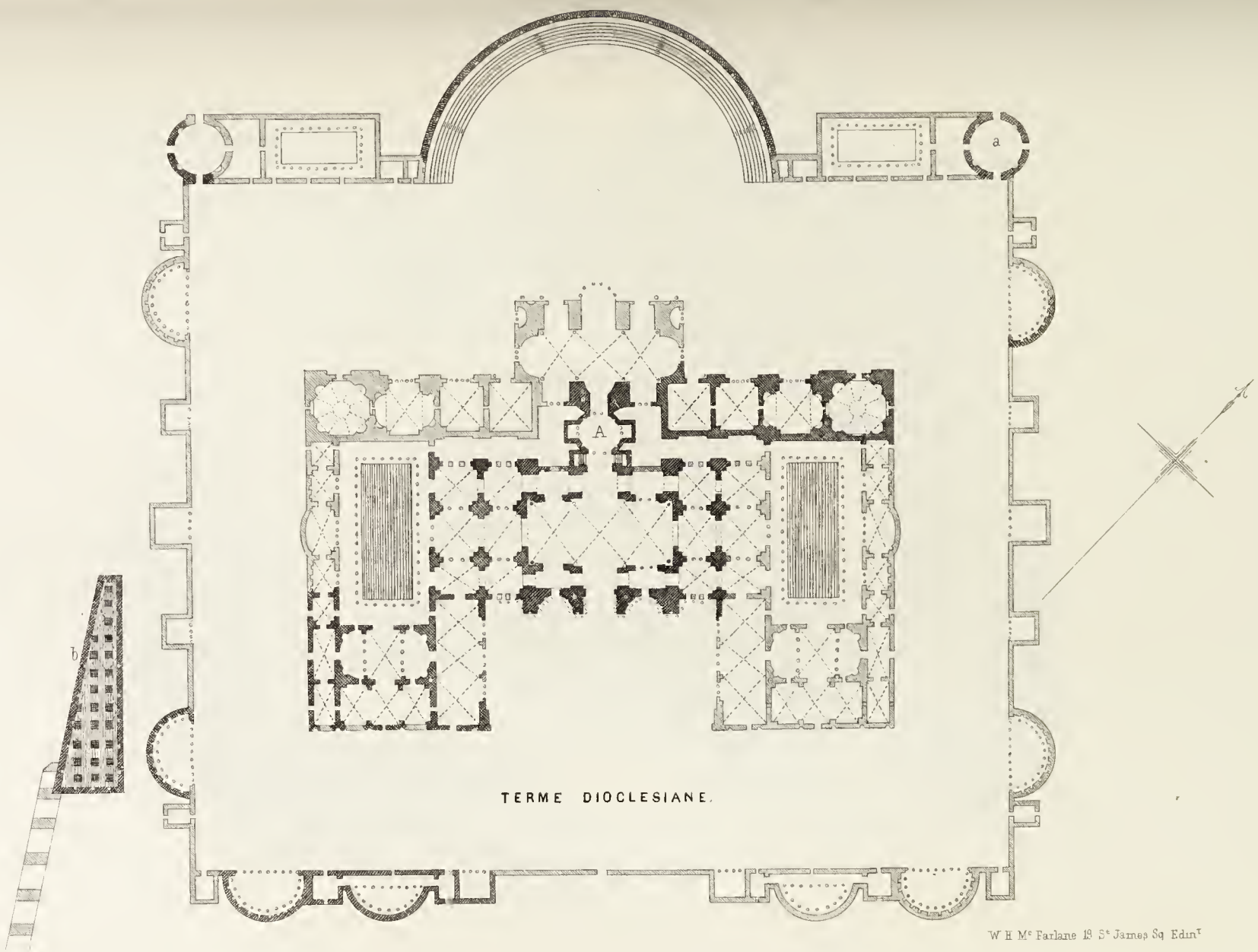


Plan of Castellum aquæ Juliæ, popularly the Trofæi di Mario.

a. b. c. sluices to shut off water as required.

Supposed ancient castellum of Aqua Virginis in the Chiavico del Bufalo.

Fontana dell'Acqua Paola at San Pietro in Montorio.



W H Mc Farlane 19 St James Sq Edinr

Plan of Baths of Diocletian.

A Modern Church of Sa Maria degli Angeli. — a. Church of S. Bernardo. — b. Ruins of Piscina.

N° XIX.

Opening into Cloaca Maxima in the Velabrum.

N° XX.

Opening of Cloaca Maxima into the Tiber.

Transactions of the Architectural Institute of Scotland,
Session 1857-58.

No. II.

ON THE

APPLICATION OF ARCHITECTURE

TO THE

COMMEMORATION OF DISTINGUISHED PERSONS,

WITH SOME REMARKS AS TO THE COMPLETION OF THE

NATIONAL MONUMENT, CALTON HILL.

BY

JOHN MURRAY, Esq., M.A.

[*Read at a Meeting of the Institute, held in Edinburgh on 29th March* 1858.]

In the following observations I propose to refer, first to the commemorative structures of ancient Egypt, then to those of Athens and of Rome, concluding with a notice of the buildings of this description which have been erected in Edinburgh.

The earliest architectural monuments now existing are the pyramids built by the Memphian kings of Egypt, upwards of sixteen centuries before the Christian era, as memorial tombs of themselves and their relatives. The fronts or faces of a pyramid appear to be practically four equilateral triangles laid against one another and meeting at the apex—a mathematical form calculated for strength and endurance. The dimensions of the great pyramid of Cheops, near Cairo, and of the smaller one of his son Mycerinus, both mentioned in Herodotus,* are as follows—length of

* Euterpe, c. 124, 129.

base, 764 and 354 feet respectively; height, 480 and 218 feet; angle of side, 51° 50′ and 51° respectively. The area of the great pyramid covers upwards of thirteen acres, its solid material of stone and brick amounting to more than three million cubic yards. The passages and chambers in the interior are lined with polished granite, and ingeniously constructed to withstand the superincumbent pressure. The two larger pyramids of Ghizeh had an external coating of fine limestone blocks, forming a crust or casing of twenty feet in thickness. The smaller one was cased with Syenite granite. Great part of these casings has been taken away at different times for building purposes.

The pyramids of Egypt were built for endurance, not for beauty; and their builders have attained their object. There is probably no architectural form so stable or so capable of resisting the influences of time and of physical force as these landmarks of the past. But the only claim which the pyramid can make to æsthetical merit arises from the massive sublimity of its size and large proportions. Without greatness of dimensions the pyramidal form is insignificant; and a small pyramid would probably be more liable than a structure of almost any other form to be covered or buried by surrounding growth and debris.

Descending from the era of the Pyramid-builders to the Theban dynasty, we find Egyptian architecture at its best period displaying itself in palace-temples and relative obelisks. The obelisks, without being sepulchral monuments, appear to have been usually devoted to commemoration of the martial achievements or personal qualities of individuals. They are essentially a feature of Egyptian architecture. The principal were at Thebes, Karnac, and Luxor, frequently set up in pairs in front of temples and doorways. The best were formed of one block of

red Syenite granite, four-sided, about ten diameters in height, shooting upwards (according to the simile of an ancient author) "like a flame." As lasting records of those ancient monarchs, whose names and titles are sculptured on them, the obelisks are of the highest order of historical monuments. Many of the finest obelisks were transported by the Roman emperors to Rome to adorn the city. In modern times, these have been restored and new placed by the popes, and are at this moment among the most remarkable structures in Rome. Of the two celebrated obelisks which stood at the doorway of the palace of Luxor, covered with a profusion of hieroglyphics, birds and other animals, admirably executed, one has been removed to the Place de la Concorde at Paris. The obelisks, in their original sites, did not stand upon pedestals. Those brought to Europe have generally been set upon pedestals.

The memorial structures of the Greeks have not endured like those of Egypt. Their art was higher, nobler, and more refined, but its productions were less calculated to resist the injurious influences of aggressive force and elemental violence.* If the distinguished men of Greece, whose actions are recorded in the writings of their countrymen, had depended on architecture alone for their posthumous celebrity, they would have been consigned, with few excep-

* Although the Grecian Doric is considered, and with reason, to be traceable to the Egyptian architecture of the Theban dynasty, it is singular that the only remains in Greece directly referring to Egyptian types, are two more or less ruinous pyramids, of a comparatively small size, in the territory of Argolis. The best preserved is that called the pyramid of Erosinus, not far from Argos. It is not quite symmetrical, and one side is longer than the other, the measurement of the base being about 49 feet by 39. The masonry consists of large, irregular blocks, with a tendency to quadrangular forms and horizontal courses.—*Mure' Tour in Greece*, vol. ii. p. 195

tions, to oblivion. Of the monuments, columns, and statues that adorned in such numbers the principal cities of Greece, but few remain, and of these very few indeed can with certainty be attributed to the rightful person in whose honour they were erected.

Statuary and sculpture are not within the scope of this paper, but it is impossible to avoid remarking the crowd, as it may be called, of statues of gods and men in brass and in marble, which are mentioned by Pausanias, who wrote in the second century of the Christian era, to have been placed in Athens and its suburbs. Indeed, in Greece, the honour of a statue must have been considerably detracted from by the numbers which were erected in all the principal towns. They appear to have been occasionally placed to ornament the locality as much as to do honour to individuals. Thus, when describing the Propylæa of the Acropolis, Pausanias remarks of certain equestrian statues placed there, that he cannot say whose statues they are, "whether they are sons of Xenophon, or set there merely for ornament."*

In the account given by Pausanias of the Parthenon, which is short and not very clear, after describing the colossal image of Minerva, by Phidias, of ivory and gold, and referring in a very general way to the sculptures on the pediments and frieze, he mentions having seen in the temple a statue of the Emperor Hadrian, who was a great benefactor of Athens, and at the entrance a statue of the Athenian general Iphicrates.† Outside the building, beneath the metopes on the eastern front, were hung a number of round shields, trophies of martial achievements.‡ The impressions of these shields still remain upon the marble, and

* Attica, c. 20. † Pausanias, Attica, c. 22.

‡ Wordsworth's Athens and Attica, p. 98.

below are to be seen traces of the inscriptions which recorded the names of those by whom the shields had been worn or won.

It is believed that the *cellæ* of the ancient temples, when the worship of the deity to whom they were dedicated was in full observance, seldom contained statuary or sculpture beyond what referred to the life and actions of the particular deity. Libraries and gymnasia, adorned with paintings and statues, were sometimes attached to the temples (as at the great temple of Jupiter Olympius at Athens), but in a distinct building. Where a temple was dedicated to a deified hero, such as Theseus, it partook of the character of a monumental structure. The bones of Theseus, who was regarded by the Athenians as one of the founders of their state, were brought from the isle of Skyros to Athens (B.C. 469), by Cimon, the son of Miltiades,* and deposited in the temple dedicated to that hero, which presents at this day one of the most perfect examples remaining of Greek architecture. Within the cella of the Theseion were paintings on the walls of the battles of the Athenians and Amazons, and the battles of the Lapithæ and Centaurs. The sculpture on the pediments, and on the metopes and frieze, was devoted partly to the actions of Theseus, and partly to the "labours" of Hercules, who, some time after the dedication, was admitted to share with Theseus the honours of his temple. This circumstance is evidence that the sculpture was added subsequent to the building of the temple. Of the sixty-eight metopes, only eighteen appear to have been adorned with sculpture. While the Parthenon is an octostyle temple with forty-six columns in the peristyle, the Theseion is on the more usual plan of a Doric temple, hexastyle, with thirty-four columns in the peristyle.

* Pausanias, Attica, c. 15.

With the exception of the Choragic monuments, the other structures of the Greeks commemorative of individuals, singly or collectively, appear to have been either sepulchral monuments or cenotaphs. Cave tombs were frequently cut or dug in the sides of rocky slopes, with columns or pilasters in front, surmounted by a pediment inscribed with the name of the deceased.* On the battle-fields of Marathon and Platæa, solid tumuli, built of earth and great blocks of stone, were raised in honour of those who had fallen in battle.

Pausanias, describing the cemetery outside the walls of Athens,† refers to the tombs of some of the most distinguished Athenian citizens, Thrasybulus, Pericles, Chabrias, and Phormio, as ταοι, sepulchres, without giving a more particular account of them. Those great men would no doubt have statues elsewhere erected to them. He refers also to various monuments, probably of large slabs of stone, raised in honour of collective bodies or troops of Athenian citizens who had fallen in battle on particular occasions; in front of some of which he mentions a column as standing, inscribed with their names and actions. One column he observed, containing inscriptions to a variety of persons, viz., "To certain men who had fallen in Eubœa, to others in the island of Chios, to certain who had fallen in the interior of Asia, and to others who had fallen in Sicily." Near one of the city gates he notices a tomb, on the summit of which was an equestrian statue of a person in military costume; "who it was he knows not, but both horse and rider were the work of Praxiteles." ‡

The Choragic monuments of Athens remain to be

* A view of one of these, supposed to be the tomb of Themistocles, is given in the seventeenth plate of Le Roy, Monuments de la Grèce, edition 1758.

† Attica, c. 28, 29.

‡ Attica, c. 2.

noticed. The prize of a victorious Choragus, or leader of a theatrical choral band, was a tripod, to display which he built a small temple, surmounted by a finial ornament supporting the tripod. A series of these temples in a line formed the "street of tripods" in Athens. Inscriptions were engraved on the architrave of each, recording the name of the party victorious in the dramatic contest, and the year of his victory. The temples were dedicated to Bacchus, the patron of dramatic representations, and were thus both trophies and temples. The only one of these which has escaped destruction is the Choragic monument of Lysicrates, a circular temple, with six engaged Corinthian columns, standing on a square basement 12 feet high by 9 in width. The temple, with its entablature and roof and finial ornament is 22 feet in height, or 34 feet, including the basement. It is justly considered an exquisite example of Grecian art.

From Athens we come to imperial Rome—

> "With towers and temples proudly elevate
> On seven small hills, with palaces adorned,
> Porches and theatres, baths, aqueducts,
> Statues and trophies, and triumphal arcs."

With the exception of the tomb of Cecilia Metella, the monumental structures of ancient Rome that remain to us are all of the time of the empire. More massive in their construction, larger in size, and erected some centuries later, they have withstood the shocks of war and barbarian destructiveness, of earthquakes and weather, better than the monuments of the Greeks. The Grecian monuments commemorative of individuals (not including in this observation national temples to heroes or demigods, such as that of Theseus), partook to a great extent of the republican character of the states of Greece. However distinguished

in various degrees particular persons may have been, to none was allowed so great an elevation over their fellows as to admit of the erection in their honour, either during life or after death, of memorial structures of extraordinary size or exorbitant cost. Their great men had statues awarded to them. The sepulchres and cenotaphs of the most distinguished were of moderate dimensions, though adorned it may be with columns and pediments. The consequence is, that the statues have been thrown down, destroyed, or carried away, while of the sepulchral monuments we have nought —

> "Save where some solitary column mourns
> Above its prostrate brethren of the cave."

At Rome it was different. An emperor or powerful general had an acknowledged supremacy and elevation. He could wield the treasures of the empire, and tax nations for his personal objects, as well as for public purposes. Pericles and Thrasybulus were rewarded with statues; but the senate and people of Rome, in flattering terms, decreed an arch of enduring masonry to Septimius Severus, and Hadrian reared, in honour of himself, a mausoleum of gigantic size.

The great memorial buildings of Rome may be divided into sepulchral monuments or tombs, arches, and columns. The following are the most remarkable —

The tomb of Cecilia Metella was erected by the wealthy Crassus to the memory of his wife, in the last days of the Commonwealth. It is a circular tower, about 70 feet in diameter, resting on a quadrangular basement composed of small stones and bricks united by mortar, and strengthened by large square key-stones of travertine, projecting at regular intervals. The tower is cased with blocks of the finest travertine accurately fitted together without cement. It is surmounted by a frieze of ox skulls, with wreaths joining

them, and a cornice, over which, in place of the original roof, battlements have been built during the middle ages. The interior contains a plain circular chamber, lined with brick, in which the sarcophagus was placed, the walls contracting conically as they rise. This monument has probably given the idea of the magnificent mausoleum erected by the late Duke of Hamilton in the park at Hamilton, though the one is by no means a copy of the other. Another monument of the same description, though inferior in dimensions, is the tomb of Plautius, near the Ponte Lucano, on the road from Rome to Tivoli. It is a circular building constructed of large blocks of travertine, encircled by a moulding rather above the middle of the height. The top was surmounted by a battlement in the fifteenth century. The lower part appears to have been masked in front, or surrounded by a series of pilasters, some of which still remain, with two inscriptions.

The mausoleum of Augustus was a circular structure of stone and earth, between 200 and 300 feet in diameter. It was in the Campus Martius, near the Tiber. Strabo describes it as "raised to a considerable elevation on foundations of white marble, and covered to the summit with evergreen plantations." A bronze statue of Augustus surmounted the whole. Round the inner circumference were sepulchral chambers, in which the ashes of the emperors and their relatives, down to the reign of Nerva, were deposited. The entrance was flanked by two Egyptian obelisks, and the ground around was laid out in groves and public walks.

Larger and more splendid than the tomb of Augustus was the mausoleum of Hadrian, now the castle of St Angelo. The basement was a square of about 340 feet, and about 75 feet high. Above this rose a circular tower 235 feet in

diameter, and 140 in height. Around the summit were statues of men and horses, in Parian marble. It was, in the decline of the empire, converted into a fortress. The upper part has been rebuilt and fortified by the popes, and the Mole of Hadrian is now the citadel of Rome. The only other monumental building to be here noticed is the pyramid of Caius Cestius, on the outskirts of the ancient town. It is a pyramid of brick and tufa, coated with slabs of Carrara marble, now black with age, and considered to be of the time of Augustus. It stands on a square basement of travertine, 3 feet high; height 125 feet, width at the base 108 feet. In the centre is a small chamber, 17 feet by 13, and 14 feet high, with a stucco ceiling covered with arabesques.

The most characteristic commemorative buildings in Rome were the triumphal arches. The arch of Titus, on the ancient Via Sacra, erected to commemorate the conquest of Jerusalem, is a single arch of Greek marble, of no great size, but of excellent execution, with fluted columns of the composite order on each side. It is celebrated for the beauty of the details of its sculpture, representing the triumph of Titus over the Jews, the procession with the spoils of the temple, &c.

At the other extremity of the Forum, just under the Capitol, is the arch of Septimius Severus, erected in the beginning of the third century by the senate and people, in honour of that emperor and his sons, to commemorate their conquest of the Parthians and Persians. It is of white marble, consisting of one central and two lateral arches. The arch of Constantine is the largest and most effective of the arches now mentioned. It has four Corinthian columns on each front. The sculpture is good, but most of the bas reliefs having been abstracted from an arch of the emperor Trajan, they are not applicable to the

history of Constantine. This arch and that of Septimius have transverse arches on the flanks. The remaining Roman arches of Dolabella, Drusus, and Gallienus, are less remarkable examples of the same description of monument. The Roman triumphal arches have been imitated at Paris on a grand scale in the Arc de l'Etoile, and on a less scale in the Arch of the Carousel.

The memorial columns erected by the Romans were similar to the arches in their dedication and purpose. The column of Trajan is too well known to require description. A spiral of bas reliefs encircles the whole shaft, representing the military achievements of Trajan, of admirable detail in point of sculpture. The lower figures of the spiral are about 2 feet in height; but as they ascend and are farther removed from the eye, their dimensions are enlarged, till at the top they become nearly double the size of those below. It was surmounted by a statue of Trajan, now replaced by St Peter.

The Antonine column was erected to the Emperor Marcus Aurelius Antoninus, by the Senate and Roman people, A.D. 174, and is similar in design, though inferior in style and execution, to the column of Trajan.

The Corinthian column standing by itself in the Roman Forum has been shown, by excavation of the base made within the present century, to have been erected to the Emperor Phocas by Smaragdus, Exarch of Italy, A.D. 608.

There is at least one temple at Rome which may be included within the category of commemorative structures, that of Antoninus and Faustina in the Forum. It was dedicated by the Senate, in the second century of the Christian era, to Faustina, wife of the Emperor Antoninus Pius, and afterwards to him jointly with Faustina. The portico consists of ten Corinthian columns, six in front, and two

on each flank, finely proportioned. The cella occupied the whole of the after-part of the building, there being no peristyle. The fine entablatures of the portico and cella remain.

IV. Having thus taken a rapid survey of the monumental structures of ancient Egypt, Athens, and Rome, we pass to the capital of the northern division of Great Britain. Perhaps the only sepulchral monument of Edinburgh, which by its size and style of building can claim to be of an architectural character, is the tomb of David Hume the historian and philosopher, in the High Calton burying ground. It is a circular tower of hewn stone, standing on a basement, open at the top, with a Doric cornice. The designer may have had in his eye the tomb of Plautius at Rome, which has been already noticed. Adjoining this, in the same ground, is the cenotaph lately erected to the memory of the Reformers of 1794, a plain obelisk of freestone. Neither of these monuments, from the place where they are set down, have much effect in an ornamental point of view. It may be observed here, that there are in the Edinburgh burial grounds and cemeteries many tombs of greater or less merit in point of style and execution, and several excellent in that kind of building. But I am inclined to protest against the number of short, ill-proportioned obelisks, with which those cemeteries are filled. The slender, tapering obelisk of Egypt, the only good form of an obelisk, is entirely lost sight of in these substitutes for grave-stones.

The monument to Lord Nelson, on the summit of the Calton Hill, has been much criticised. It is not unlike the light-house towers occasionally seen on the coasts of Italy and the Mediterranean. If half of its windows were blocked up, the exterior of the tower relieved with some sort of ornament, and a sea-light put in the top, the effect which its

position must always give it might be increased. Nelson's monument was built by Mr Burn, architect-builder, father of the eminent architect Mr William Burn. This and the other monuments, now to be noticed, have all been built within the present century.

The column to the first Lord Melville, in St Andrew's Square, is of Roman Doric, the general design being that of the Trajan column. Its whole height, inclusive of the statue, is 150 feet. The shaft is fluted, and the pedestal, instead of sculptural ornaments, has four plain panels on the sides. The architect was Mr W. Burn. The architectural effect of this column would be greatly added to by the enclosed green of St Andrew's Square being converted into a paved *Place*. The admirable effect of a similar column in a paved space, is seen in the Place Vendome at Paris.

The Scott monument, which is well placed near the east end of Princes Street, in view of the picturesque ridge of the Old Town, is a structure of which Edinburgh may be proud. It is of that sort of building called a Gothic cross, upon a large and grand scale. The composition is partly derived from the steeples of Antwerp Cathedral and of the Hotel de Ville of Brussels, perhaps more from the first of these, without being a direct imitation of either. The style and detail are taken very closely from Melrose Abbey, than which there could be few better models in Gothic work. The height of the building is 200 feet, 6 inches. It was commenced in August 1840, and finished in 1844; the cost, which was defrayed by subscriptions from the country and England, as well as from Edinburgh, being £15,650. The design was by George Kemp, an architect of talent, who unhappily did not survive the execution of his design. The effect of the Scott monument is greatly enhanced by the

skilful widening and laying out of the terraced plateau on which it stands. The English Gothic crosses at Northampton, and at Waltham in Essex, erected by Queen Eleanor, are of small dimensions compared with this monument, though highly praised by Rickman for the beauty of their details.

The votive structure in honour of Robert Burns, of which the general design is taken from the round temple at Tivoli, is a good specimen of classical architecture, though hardly equal in beauty and purity of style to the monuments of Stewart and Playfair on the Calton Hill. The solid piece of stone-work at the top, supporting the tripod, is heavy, and does not add to the beauty of the composition. Nothing of the kind is to be seen on what remains of the Tivoli temple. The pedestal does not seem to be improved by the squaring of the angles. This monument is extremely well placed, and it would have been barbarous to move it, as was recently proposed. It is by the late Mr Hamilton, architect of the adjoining truly classical building of the High School.

The monument to Dugald Stewart is considered the most successful of the monuments on the Calton Hill. With the Choragic monument of Lysicrates, no doubt, in his view, the architect (Mr. W. H. Playfair) has varied considerably from that original. While the one is solid in the centre, with six engaged Corinthian columns, the other is open, with eight columns, having a large stone urn in the centre. The roof and cornice of the Stewart monument is simple and chaste, while the upper part of the other is in the richest style of art. The pedestal of the Athenian monument is square, that of the Scottish round.

The small monument to Professor Playfair, by the same architect, is a good example of Greek architecture.

Solid and four-sided, with engaged Doric columns and entablature, it stands upon a pedestal of about its own height.

We come now to the twelve noble Doric columns on the Calton Hill, properly or improperly called "The National Monument."

By the Act of Parliament passed in 1848, at present regulating this unfinished undertaking, it is provided, that the building "shall on its completion be devoted to the purpose of a receptacle or gallery for monumental busts and statues, or other memorials of great and distinguished persons of all nations and periods." It is farther enacted, "that the plan and design of the said National Monument, in its external architecture, and in its internal decoration, shall be such as has been already adopted by the said Directors or Committee of Management, and been approved of by the said Association: provided always that it shall be competent to the said Directors or Committee, or to the said Association, to make such alterations upon the details of the said plan, from time to time, as may appear expedient."*

The relative resolutions adopted by the Directors were to the effect—1. That the exterior of the building, as already proposed, should be a restoration or *fac simile* of the Parthenon or Temple of Minerva, on the Aeropolis of Athens. 2. That the eastern and western pediments, the frieze, and metopes of the peristyle, should be decorated with national sculpture, in imitation of the general style and arrangement of the original. 3. That the interior should form one great hall, lighted from the roof by flat cupolas or lanterns, and communicating by vestibules with the eastern and western fronts, the hall to be so arranged as to afford ample scope for pictorial decoration, whether in fresco, encaustic, or oil colour. 4. That the great hall

* 11 Vict., sects. 1, 2.

should be set apart for the reception of busts and statues, not groups, of eminent men, statesmen, warriors, men of science, poets, artists, &c.—not limited to Scotland, or even to Great Britain, but extending to all nations: the cost of such statues or busts to be defrayed by those who send them, while a discretionary power to accept or reject is reserved, but being once received they were to be permanent.

From whatever cause, the undertaking of a National Monument, on the plan of the Parthenon, has failed in obtaining that public support which the enthusiasm displayed at its commencement in 1822 might have warranted us to expect. When, after the lapse of some years, the subscriptions amounted to about £16,000, the Directors resolved to proceed with the building as far as the funds would admit. It was accordingly begun under the superintendence of Mr Playfair, from plans furnished by Mr Cockerell, and the twelve columns, with basement and architrave, as they now appear, were built, exhausting the sum at the disposal of the Committee.

As regards the object of the proposed building, it would no doubt be very desirable to obtain a fit receptacle for monumental busts and statues. But might it not be well to extend this purpose to the reception of high art sculpture of other descriptions? The Royal Institution and National Gallery buildings in Edinburgh are devoted to their own objects, and there is no gallery for sculpture of any kind in Scotland. Large and costly statues of marble or bronze may be placed, as they now are, in suitable situations in the open air, or in a hall such as the Outer Parliament House; but smaller memorial statues, busts, or bas-reliefs cannot. Christian churches, even if there were more than there are in which works of sculpture could be placed, are, in the opinion of many, not the most appropriate

places for sculpture devoted to private persons, and which not unfrequently refers to pagan mythology.*

A receptacle for sculpture, such as is now proposed, would afford appropriate room for monuments of various kinds, and would probably elicit from private houses many works of art which proprietors might wish to see transferred to public custody. And in cases where Government recommends or permits monuments to be erected to particular persons in Westminster Abbey or St Paul's, the Grecian Hall on the Calton Hill might share this distinction with those two national churches.

So much for the purpose and object of the intended building. And now, let us consider whether a practicable plan can be adopted for carrying this purpose into effect.

The Acts of Parliament, 3d Geo. IV. and 11th Victoria, are considered, and with some justice, to have by their provisions rather hampered than assisted the prosecution of the original plan, such as it was, and I would, with great deference, recommend their abrogation. Looking to the proposed extension of the purpose and objects of the building in question—viz., that it should be a *Gallery of Sculpture* for the reception of memorial busts and statues, and of high-class sculpture of other descriptions—the completion of the building is an undertaking which might with great propriety be transferred to Government. There is little doubt but that an Act of Parliament would easily be obtained for transferring to the Commissioners of Her Majesty's Works the rights and interests of the subscribers and shareholders under the former Acts, in the portion of the structure which has been already built, and in the undertaking

* Every one, whose power of observation is not blunted by custom, must be struck with the singular mixture of all kinds of monuments in Westminster Abbey, some of them in their details not the most proper to be placed in a church.

generally. Of late years the attention of the country has been so much directed to the cultivation of high art, that it is believed the carrying out of this plan—having for its object the encouragement of art in one of its principal walks, and the providing a fresh field of intellectual gratification and instruction to the people—would hardly fail of obtaining support among the members of a British House of Commons, albeit generally economical as regards Scottish purposes.

In order to complete the building, making available the twelve columns already raised, and the substruction, three different methods seem to be open, viz.—1. To carry out the Parthenon plan. 2. To alter this plan to a hexastyle peripteral temple, shifting two of the eight front columns to the flanks, the peristyle then to be of thirty-four columns. 3. To convert the Parthenon plan into that of an amphi-prostyle Doric temple, building the cella or body of the structure back from the portico columns as they now stand.

1. The objections to which the first of these plans is exposed are formidable. To make a fac-simile of the Parthenon is literally impossible. Even supposing the architectural design of the Parthenon could be well executed in freestone instead of marble, the sculpture on the pediments, metopes, and frieze—an essential part of the Parthenon—could not be imitated to the same degree of excellence in modern work; and if it could, the expense might well daunt the most sanguine admirer of this plan. It has been recently estimated, that to complete the building on the plan of the Parthenon, without sculpture, would require a sum of £90,000. With sculpture, no estimate could reach the sum. It is, moreover, very questionable whether the imitating and copying a building, however perfect, so as to make a model or fac-simile, would be conducive to the progress of the arts of architecture and sculpture.

2. The second method in which I have supposed the building might be completed, is to a certain extent liable to similar observations as those now stated, but would be more practicable. The plan of the Parthenon implies a peristyle of forty-six columns, having eight columns at each end, and seventeen (including the angle columns) at the sides, forming an octostyle peripteral Doric temple. Retaining the present measure of columns and entablature, than which nothing can be finer, this plan might be altered to that of a hexastyle peripteral Doric temple, such as the temple of Theseus at Athens, having six columns at the end, and thirteen (including the angle columns) on the sides, making a peristyle of thirty-four columns. For this alteration of plan it would be necessary to shift two of the columns from the present row of eight, placing them on the side line of columns, which would also require to be shifted to suit the breadth of a hexastyle temple. The cella, or body of the building, would on this plan be contracted, perhaps too much so for the internal accommodation, though it might be more manageable as to roofing and lighting. The expense of this has been estimated at about £60,000, exclusive of sculpture. It would be a structure of pure Grecian Doric, without being a direct copy of any one temple; and there would not, as in the first case, be the risk of comparison with a faultless original, more especially in the matter of sculpture.

3. The third method indicated would probably be the most practicable. As the twelve columns now stand, they already form a portico to the cella, or main building, which might be erected in their rear. In the hands of an eminent architect, a handsome and solid structure, keeping as near as possible to the idea of the cella of a Doric temple, would complete the present columnar arrangement, which, if it continue much longer as it is, will become literally what it

has been called—a modern ruin. The general plan of this building would be that of an amphi-prostyle Doric temple, of the dimensions as nearly as possible of the Parthenon, but capable of affording more interior accommodation than upon either of the already mentioned plans, inasmuch as the cella, having no peristyle, would be larger than even the cella of the Parthenon. It would have a pediment, portico, and doorways at each end, and would be adorned with a cornice and frieze along the sides. The western portico, with its pediment, would be the part of the building seen from Princes Street. The cost of the building, completed upon this plan, has been estimated at a sum from £25,000 to £30,000.

The subject we have now been discussing is one of present interest, and the argument upon it may be summed up in these very simple propositions —

1. The unfinished structure on the Calton Hill, called the "National Monument," is a standing reproach to the country of Scotland, and ought, with as little delay as possible, to be completed.

2. The purpose to which we have proposed it should be devoted — viz., to be a Hall or Gallery for the reception of Monumental Busts and Statuary, and of Sculpture generally, is not in itself objectionable, but a purpose to be encouraged, as tending to honour the dead who have deserved well of their country, and to promote art in its highest form of development.

3. To carry this purpose into effect is an object worthy to be taken in hand by the Government, through the Board of Commissioners of her Majesty's Works, and in which there may be reason to hope they would be supported, both by the highest personages in the realm, and by a Parliament actuated by patriotic and generous motives.

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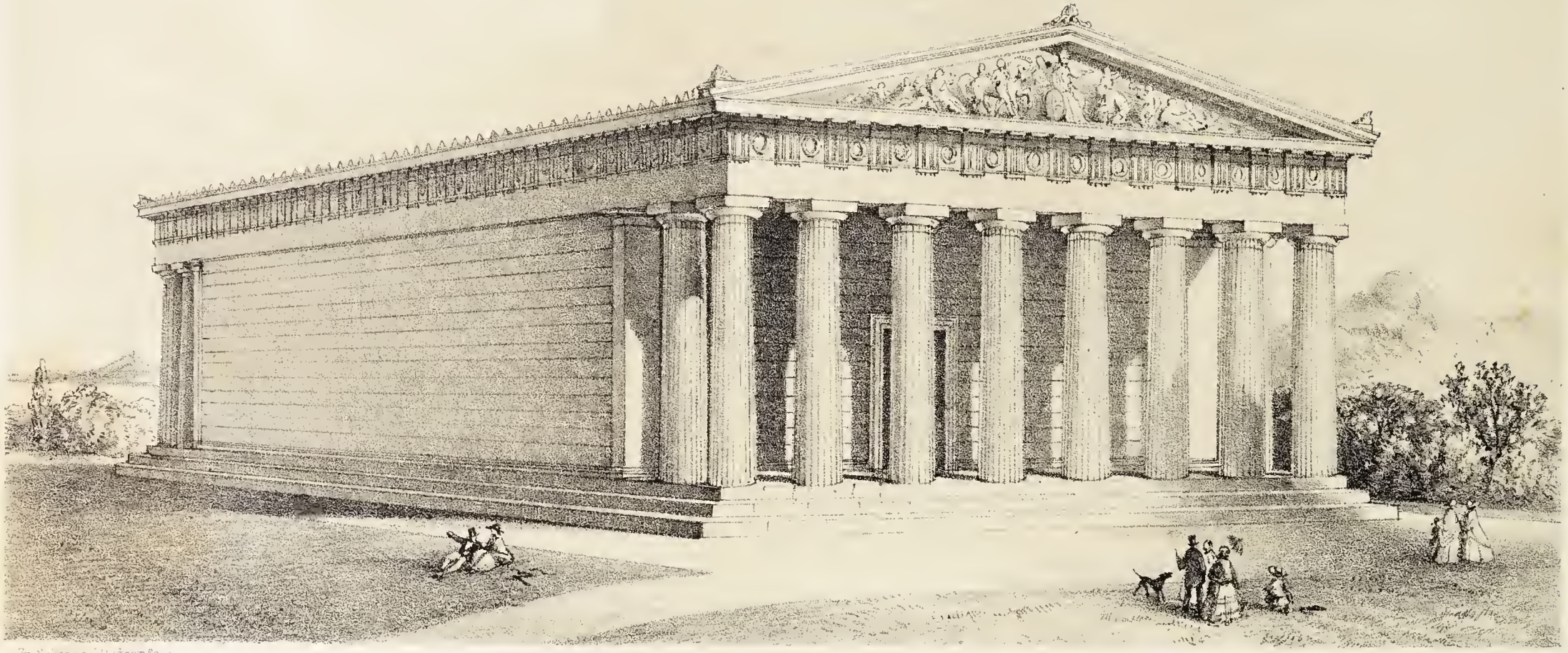

VIEW OF THE STRUCTURE ON THE CALTON HILL, AS COMPLETED ON THE PLAN OF AN AMPHI-PROSTYLE DORIC TEMPLE.

TRANSACTIONS.

SESSION NINTH.

1858-59.

TRANSACTIONS

OF THE

ARCHITECTURAL INSTITUTE OF SCOTLAND.

SESSION NINTH.

1858–1859.

VOLUME V. PART III.

EDINBURGH:
PRINTED BY MURRAY AND GIBB.

MDCCCLX.

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INTRODUCTORY ADDRESS.

Transactions of the Architectural Institute of Scotland,
Session 1858-59.

INTRODUCTORY ADDRESS

BY THE

REV. WILLIAM LINDSAY ALEXANDER, D.D.

[*Read at the Annual General Meeting of the Architectural Institute of Scotland, held on the 6th December* 1858.]

My Lord,

It is with a feeling of diffidence, amounting almost to reluctance, that I appear before you on the present occasion. When I was first invited by the Council to address the members of the Architectural Institute of Scotland at the opening of this session, whilst I was not indifferent to the honour involved in such a request, I felt myself so utterly unfurnished with such materials as seemed to me indispensable for the proper discharge of such a duty, that the only course open to me, as I thought, was respectfully, but decidedly, to decline the invitation. On further correspondence, however, I learned that this Institute is not confined to professional architects, or even to such as may be entitled to call themselves amateurs of the Architectural Art, but is open to all who, from

whatever motive, wish well to that Art, and are desirous of advancing its interests; and I learned, also, that it is not expected of the person who delivers the opening address, that he should belong necessarily to the former of these classes; and that, of those who have preceded me in this duty, some have avowed themselves as belonging only to the latter. This seemed to open for me the prospect of being able to comply with the request of the Council, without appearing absolutely ridiculous in the eyes of those whom I should address. I felt that I could with all sincerity profess myself an admirer of good Architecture, and a well-wisher to that Art; and that, if permitted to stand simply on that ground, and not pretending to more knowledge of the subject than I really possess, I might venture without presumption to ask you to listen to me while addressing you from this place. On this ground, then, it is that I appear before you on this occasion. I am nothing of an architect, nothing of an artist, and an archæologist only on a very small scale. But I have a sincere admiration for fine buildings: I can see endless beauties in old gables, dilapidated chimneys, and half-effaced mouldings; and a stately cathedral, with its massive masonry, its exquisite carvings, its lofty columns with their foliaged or fantastic capitals, its groined vaults, its mullioned screen and windows, and all the recondite enchantments that lurk in corbel and crochet, boss, bracket, and buttress, has for me a charm which I cannot express in words. As a lover of your Art, therefore, I speak to you on the present occasion. Unable to treat the subject either scientifically or practically, I beg that you will accept what I am about to offer, simply as setting forth how certain points connected with Architecture strike the unskilled mind, which views it from a purely æsthetical point of view, as one of the Fine Arts.

The fundamental idea of a building is, that it is made for

some end—for some use. Whether it be a place for habitation, or a place for work, or a place for worship, it is as a means to an end that it must be contemplated under its fundamental and primary aspect. The first concern of the architect, then, is to apprehend exactly and fully the purpose for which his design is required; and his next is, to see that by the best exercise of his faculties that purpose may be most fully secured, with such materials and means as are within his reach. And here a wide field is opened to the genius of the architect—a field which only genius can successfully explore, but where there is scope for the most diversified exercise of that many-sided faculty. There is no end to the devices by which a true genius, duly nurtured, and supplied with materials drawn from the exhaustless treasuries of Nature, may lavish beauty and grandeur on architectural structures. There is no reason in Nature why what has been may not be again; the resources of art are not exhausted, nor the fountain of human genius dried up; and if our students of Architecture will but give their genius free scope and proper culture —if they will be less of mere builders, and more of artists—if they will, without neglecting books and instruments, go more frequently, and with more of single-hearted, loving teachableness, to the great free school of Nature, where lessons beyond all price are given to all without price,—there is no reason why aught of weakness or common-place should adhere to the Architecture of the future, or why the nineteenth century should not hand down imperishable monuments of architectural skill that shall divide with those of the Middle Ages the admiration of coming generations. I know of but one limit—of an æsthetic kind, I mean—that is to be set to the ambition of the architect to make his designs ornamental; and that is the limit imposed by the Great Architect of all upon Himself in adorning the world we inhabit—that the

ornament, namely, shall not be something extraneous put upon the structure for the sake of ornamenting it, but shall be in the structure itself, and grow naturally out of it—the beautiful out of the beautiful, the grand out of the grand, even as the foliage grows out of the tree, or the mountain's dome swells out of its massive piled-up sides. Within these limits, I would allow full and free scope to the artist in the decoration of his structures; persuaded that true genius following Nature cannot greatly err; and that, though sometimes a strong and daring spirit may produce what purists and pedants will condemn, his creations, if confined within the limits indicated, will not fail to bear on them those marks of truth, and those features of beauty or strength, which will awaken admiration in all who judge from their own emotions rather than from set rules.

In this country, the class of edifices which, taken as a whole, afford to the architect the best sphere for the higher exercise of his powers, are those dedicated to religious uses. I may, therefore, be allowed to refer to them particularly in application of the remarks I have just made.

A church is a building erected for the public, or at least social, worship of God. The first requirement, then, of all churches is, that they shall be suitable for this end, according to the method of worship followed by those who are to frequent them. Hence a capital blunder is committed when a church intended for one kind of service, is followed as a model for a church in which service of a totally different kind is to be observed. In this case, to say nothing of inconvenience to the parties who assemble for worship,—amounting, perhaps, to a total frustration, in some instances, of the very purpose for which they have assembled,—the taste is offended by a constant sense of *unfitness* in the building for its professed end, and a consequent conviction of ignorance or incompetency some-

where, on the part of those who have had to do with the causing of such incongruity.

In our Protestant worship, the part of the service conducted by the officiating minister is by far the most important. The place, therefore, which he is to occupy, ought to be taken as a sort of central or fixed point, to which all other arrangements should be made relative. In the first place, care should be taken that his position should be easily *seen* from all parts of the church; for no congregation can be kept attentive or interested if any considerable portion of them cannot see the person who is conducting the service, or can see him only with difficulty and by an effort. In the second place, it is necessary that he should be easily *heard* by all the congregation; that is, that in point of size and internal arrangement, the building shall be such as that a man of ordinary powers of utterance shall be able to make his words reach the ears of all whose devotions he professedly leads, or to whom his instructions are addressed; for if the preacher has to strain his voice in order to be heard, or, if the audience have, in any parts of the house, to gather his meaning only by painful efforts of attention, or in spite of constant disturbances of sound, such as those produced by an echo, the great ends for which the building has been erected are so seriously interfered with, that it may come to be a question, whether those ends would not be better answered by a meeting in the open air. In the third place, provision must be made for the comfortable accommodation of the congregation: such as roomy pews; seats constructed so as to afford ease to the occupant; kneeling-boards (where these are used) adjusted to the proper angle at which the lower limb declines from the knee-joint, so as to rest easily upon the toes; and, perhaps above all, a due regulation of the internal atmosphere by a proper system of warming and ventilation, so as that the congregation shall neither suffer from

severe cold, nor be exposed to trying draughts, nor be rendered somnolent and stupid by imbibing the poison of air that has been already breathed. To this last requirement, allow me to say that I attach the greatest importance; knowing from experience the serious and sometimes lasting evils that arise from bad ventilation in our places of worship, and knowing also from experience the difficulty of getting practical men to look seriously at this matter, and make the proper ventilation of buildings an object of primary importance. I know that the subject is considered to be one of difficulty; but I cannot help believing that the difficulty has been greatly increased by the mere pedantry of science on the one hand, and the obstinacy of empiricism on the other; and that, if men would ventilate their buildings as God ventilates this great world on which we dwell, by the proper use of fire, placed so as to create a current along which the vitiated air must necessarily pass,—in other words, if they would invite the air to obey its own laws, instead of expecting it to succumb to their convenience, or prejudice, or ingenuity,—they would find that it is not more impossible to make the air their minister, than it has been to make steam or the electric fluid perform the will of man.

These three requirements appear to me to be those specially demanded by a regard to utility in the erection of a building for Protestant worship; and if to these be added provision for the easy ingress and egress of the congregation, so as to prevent collision or uncomfortable crowding, all would be supplied which mere utility is entitled to prescribe. But who would wish the architect to stop here? Enough has been done for the purposes of bare utility: is nothing to be done for the sake of gratifying taste, inspiring pleasing and elevated emotion, and making the place where men assemble to worship expressive, in some degree at least, of those feelings of reverence and

devotion in which the essence of worship lies? Among all nations, the temple of the Deity has ever been the place on which they have sought to expend their utmost efforts of costly decoration: shall Christian temples alone be mean? and shall it be in the worship of the one true God alone that taste, and wealth, and skill shall be forbidden to offer their resources as a sacrifice to Him? I am aware of the prejudices which influence many excellent and pious persons, in the way of leading them to imagine that an humble, unadorned edifice is somehow more in keeping with the character of our religion, and more adapted to promote its interests, than one on which the ornaments of artistic genius have been bestowed. But with such sentiments I can feel no sympathy, founded, as I cannot but consider them to be, in ignorance both of the true relation of art to religion, and of the obligations which devolve upon Christians in reference to the places which they erect before the community for the service of God. It needs but a very slender acquaintance with the history of art to satisfy us that it has always and everywhere been as it associated itself with religion, and became her handmaid, that it has prospered, and become rich and strong; and no person can doubt that, of all religious art, the highest and noblest is that which has sprung from the fostering bosom of Christianity. We hear much of Grecian and Roman art; and men fall into raptures at the very mention of the Parthenon, the Apollo Belvidere, and the Arch of Trajan; but, save in the one respect of physical beauty, it may be doubted whether the finest remains of ancient art will stand comparison with even inferior specimens of that art which Christianity has evoked and inspired, and whose noblest productions are directly due to her influence. Certain it is, that, as in Music, so in Painting and Sculpture, it is not till we come within the pale of the Church that we find the artist breathing into his work the strength,

the majesty, and the richness of a deep moral earnestness, and find ourselves in the presence of something far more solemn and glorious than any beauty of mere form or composition can ever be. And if it is thus from Christianity that art has obtained its highest development, is it not fit that to Christianity art should render its willing service? nay, does not the very historical relation of the two indicate that there is a natural affinity between them, which it is not for the interests of either that we should disturb? Besides, if it be proper that intellect should bring its choicest offerings, and lay them on the altar of the sanctuary, why should genius and taste be forbidden to approach when they, too, are willing to consecrate their service to God? If it be proper that the preacher should exert his utmost resources of thought, and imagination, and eloquence, to engage the minds and impress the hearts of the audience, why should it be thought wrong that the music of the sanctuary should strive also to influence them in the same direction, and that the silent eloquence of wall and roof, and aisle and window, should be brought all the while to bear upon the sustenance and elevation of the devotional emotions? And, in fine, is it not proper that the places we erect for the worship of God should bear some impress of the estimate we form of the end for which they are erected, and the value we attach to it? It seems natural for those whose hearts are filled with a sense of worship and gratitude to the Almighty, to give expression to that by accumulating the most costly ornaments they can obtain on the place consecrated to His service. Whatever genius or art can accomplish—whatever gold, or ivory, or marble can supply to beautify the house of the Lord—it would seem only becoming that those who erect it should strive to procure, that it may stand to coming generations as a venerable monument of their piety and devotion. So thought and felt those who erected the stately edifices that still remain to us from bygone

ages, and constitute at once the glory of those ages and the pride of ours,—the men

> "Who fashioned for the sense
> Those lofty pillars—spread that branching roof,
> Self-poised, and scooped into ten thousand cells,
> Where light and shade repose, where music dwells,
> Lingering, and wandering on as loth to die,
> Like thoughts whose very sweetness yieldeth proof
> That they were born for immortality."—WORDSWORTH.

But whilst I would plead for the decoration of our places of worship to the full extent to which it is possible to carry it, there are two conditions by which I should seek to limit and regulate the use of this. The one is, that the ornaments introduced shall be in keeping with the character and design of the building; the other is, that the ornament shall form part and parcel of the edifice or its necessary furniture, and shall not be something put on it or into it for the mere sake of ornament. The former of these conditions is transgressed when a church is decorated after the fashion of a theatre or a music hall; and the latter is transgressed when the church is made a depot for monuments or statues, when pictures are hung upon its walls, or when ornaments of any kind are patched upon it, either without or within. I would have all such extrinsic ornaments swept out of our churches, and that on æsthetic grounds, as well as grounds of another and higher kind. When, for instance, I see a picture hanging upon the wall of a church, I am led to ask, Is the wall for the picture, or the picture for the wall? If the former, then is the church desecrated to the level of a picture gallery; if the latter, then has the architect failed of his duty, in that he has produced what is either so ugly that it needs to be covered, or so mean that it needs to be relieved by hanging on it what is altogether foreign to

itself. In either case, the picture is where it ought not to be; and the same is true, though, I admit, in a less degree, of Sculpture. I would have the church itself sufficient for its own glory. I would have its own proper materials so wrought and arranged, that it should be in itself a complete and harmonious work of art, of which we might say, in the words of the quaint old poet,

> "Beauty in thee takes up her place,
> And dates her letters from thy face,
> When she doth write."

I would have "the stone cry out of the wall, and the beam out of the timber answer it," and all conspire, as in one grand anthem of worship,

> "To rouse the heart and lead the will,
> By a bright ladder, to the world above."—WORDSWORTH.

It would be an interesting inquiry, had we time to pursue it, What are the causes which have chiefly operated to lower the style of our ecclesiastical Architecture in this country for several generations past? I shall not attempt to enter on such inquiry, for which I not only have no time at present, but feel that I have not the adequate resources even were the time provided; but I will venture so far as to say, that it strikes me that the prevailing defect of modern ecclesiastical Architecture is, that it is too timid, too conventional, too much enslaved to usages and traditions received from the Fathers. We are all apt to become the slaves of a creed, and to content ourselves with drinking of the streams that have flowed down to us from those who have preceded us, instead of exercising our right of exploring for ourselves the ancient fountains.

But, so long as such bondage is submitted to, the efforts of native genius must be cramped, and her fire damped if not utterly quenched. This is true in every department of pursuit;

and it is not less true in reference to Architecture than in reference to the other arts. How much, for instance, is sacrificed to what is technically called Congruity, or adherence to certain so-called orders of Architecture! Is not this, I ask, wholly artificial? Who cares anything about such congruity? Who knows even anything of it but the architect himself, or the architectural amateur? On the mass, this scrupulous adherence to artificial distinctions is wholly lost. There is nothing in Nature to which they answer—their validity is wholly historical and professional; and hence the natural taste is not bound by them, but is prepared to accept any mixture of styles and orders that shall result in a real accession to our stores of architectural beauty or grandeur. Nor am I speaking here merely at a peradventure. Of all the styles of Architecture, is there one more generally felt to be picturesque, attractive, and striking, than the Italian Gothic—a style denounced by architects as an incongruous amalgamation of the classical and pointed styles? Their objections are, I doubt not, in a technical point of view, very forcible, perhaps wholly unanswerable. I cannot help it. I find myself gazing upon the façade of the Cathedral at Sienna, or standing under the dome of the Church della Santa Maria dei Fiori at Florence; and I say, "Gentlemen, this is what you call Italian Gothic, and what you denounce as an architectural heresy. Your objections may be very sound, but they are much too technical for me to appreciate them. All I know is, that I *feel* myself here in the presence of the Beautiful and the Majestic; and I must continue to admire and rejoice in spite of all you say, having this at least for my comfort, that if in this I err, I err in the company of at least ninety-nine out of every hundred of those who behold what is now before me."

Having ventured thus far, I will take it upon me to advance a further step, and give utterance to the wish that architects

would less slavishly tie themselves by a regard to the merely symmetrical, and would allow their genius to aim boldly at that higher and richer beauty which a more poetical treatment of their subject would secure. That there is beauty in symmetry I do not deny, and, within certain limits, regard must be paid to this. But symmetry seems at the best mere formal beauty; and when it is cared for pre-eminently, and to the cramping of the artist's genius, and the prevention of the nobler creations of his art, there can be no doubt, I think, that it is retained at a cost immensely greater than it is worth. And yet to what sad sacrifices of both the useful and the noble in Architecture has the passion for symmetry led! I am reminded here of a lively passage in a letter of Madame de Maintenon concerning Louis XIV.: "He thinks of nothing," she writes, "except grandeur, magnificence, and symmetry. He prefers to endure all the draughts from the doors, in order that they may be opposite each other. At Fontainebleau I have a beautiful apartment, which is equally exposed to heat and cold; having a window the size of the largest arcade, without sash or shutters, because they would be an offence against symmetry. Do not suppose I can put a screen against my great window; you must not arrange your room as you like when the King visits it every day, but you must perish in symmetry." It cannot fail to strike the observer how little regard is paid to symmetry in Nature. Take a leaf, for instance: it has no symmetry; the two sides are not equal; the bounding line on the one side is not the same as that on the other; and the veins which part from the line that divides it are not arranged symmetrically. So also as respects the arrangement of the leaves on a branch; of the branches on the trunk; of the tree as a whole; of the grouping of trees scattered by the hand of Nature on plain or mountain-side: nowhere do we see symmetry, but the most lordly neglect of it. It is not till you enter the sphere of artificial culture that

you become aware that a regard for symmetry has been predominant in the arrangements that meet the eye; as, for instance, in the parterres and plots of the gardeners,—a race in whom this small passion is usually so dominant, that one can almost believe the story that is told of one of them, that having caught a boy trespassing, and put him in hold, he went forth straightway and apprehended another, who was wholly innocent of any offence against him, and put him beside the other for the sake of symmetry! Nature, in her profuse and luxuriant culture, seems to despise all such feeble expedients, and forces our homage by the very magnificence with which she sets at nought the rules of our artificial systems; like some haughty beauty who tramples under foot the petty commonplaces of a conventional courtesy, only to charm us with displays of grace and dignity which no artificial training could confer. And in this respect, let me add, the great masters of Mediæval Architecture were true scholars of Nature. With them, symmetry went for very little; for they were thinking of higher things. They made it bend not only to general effect, but even to vulgar utility. "It is one of the chief virtues of the Gothic builders," says Mr Ruskin, "that they never suffered ideas of outside symmetries and consistencies to interfere with the real use and value of what they did. If they wanted a window, they opened one; a room, they added one; a buttress, they built one; utterly regardless of established conventionalities of external appearance, knowing (as, indeed, it always happened) that such daring interruptions of the formal plan would rather give additional interest to its symmetry than injure it."[1] Such boldness was a sure token that the architect found himself master of his work; that it belonged to him, not he to it; and that he could make it do his bidding and work out his will, whilst it,

[1] Stones of Venice, vol. ii. chap. 6.

at the same time, embodied and expressed his most poetic conceptions.

I have but one more wish to utter, and then I shall relieve you from any further listening to me. It is this, that there were in the public mind a more worthy conception of the dignity and worth of good Architecture, a more generous appreciation of the position and claims of the architect, and a more liberal expenditure in the erection of buildings, so as to furnish scope and encouragement for the higher efforts of architectural genius. It seems to me a strange thing, and a thing to be deplored, that the architect, as such, has no recognised position in society or among professional men. Why should not Architecture constitute one of the learned professions, to which candidates are admitted after due examination, and by regular diploma? At present, I really do not know how a man becomes an architect; but I presume there is no legal barrier, or even conventional impediment, to any man taking up the profession who pleases. Such a state of things, I feel sure, is detrimental to the best interests of the profession. A mere trade may make its way with the public, by simply supplying well and cheaply the article in which it deals; but when any occupation aims to be regarded as a profession (and this Architecture surely is), it labours under a grievous disadvantage, so long as it does not hold out to the public a sufficient guarantee that those who claim to follow it are duly qualified so to do. As respects the conduct of the public in regard to Architecture, there are two things against which I feel inclined to reclaim,—the one of a special, the other of a more general kind. Of these, the former is the right, so extensively exercised by Commissioners of Improvements and Town Corporations, of dictating to architects the style in which alone they shall be allowed to build, and even the very quarries from which they shall fetch stones for their building. I cannot believe that such dictation is

either for the interests of art, or compatible with the rights of individuals, or the respect due to such a profession as that of the architect. The other evil to which I refer, is the general disposition to contract for all sorts of cheap work that can be made to look passable, instead of seeking to secure really good and noble work by a generous expenditure, such as shall be sufficient to secure such work. This is a great evil in many ways; and how much it prevails at the present day, I need not say. Sometimes, indeed, we see people going to the opposite extreme, and sacrificing too much for the sake of architectural effect. Sometimes a country gentleman, for instance, sets about erecting a mansion, which costs him so much, that after it is finished he can hardly afford to live in it; and sometimes a city congregation plunges itself in abysses of debt, by building a church which it is unable to pay for. Such things are not to be desired, certainly; and it were well that some friendly counsellor were at the elbow of the parties, to repeat to them some such counsel as that which Archbishop Sands is said to have given to Sir Robert Stapleton, who, being about to erect a palace greatly beyond his means, which he meant to call *Stapleton's Stay*, invited the Archbishop, "for the more credit, and, as it were, blessing to the house," to give it that name; whereupon his Grace said, "Nay, rather, let me say to you, *Stay, Stapleton;* for if you go forward to set up this house, it will pull you down."[1] But such are exceptional cases: the general tendency is in the other direction; and hence we are overrun with flimsy structures, decorated in the worst possible taste, or with mean and melancholy structures, that look as if taste and they were at mortal antagonism. Especially is this to be regretted, I think, in regard to places of worship; for they not only are necessarily identified with the credit of the religion for the service of

[1] Harrington, Nugæ, vol. i. p 205, ed. 1799.

which they are erected, but exert a constant educational influence on the æsthetic emotions and preferences of the community. Every church should have something worthy and striking about it: it should not only be a provision for convenience, but a monument of sacrifice and a memorial of worship; and for this end, congregations should be stimulated to do their very utmost to erect buildings of a high architectural character for the service of God. It was thus that the magnificent fabrics of the Middle Ages were erected—not by

> "The lore
> Of nicely calculated more or less,"

but by the generous outpouring of those who were determined to do what they could for the service and honour of God. In this work all classes combined, and vied with each other which should bring the costliest offering to the common work. Look, for instance, at that noble cathedral, drawings and models of which are on your table this evening—the Cathedral at Chartres. To build that grand edifice, bishops gave their fortunes; kings and queens even from other lands sent donations; tradesmen clubbed together to furnish some costly part of the building; even the poor water-carriers put in their windows, each of which must have cost hundreds of pounds; and those who had no money to give, poor priests and peasants, gave their labour, and were yoked like oxen, that they might drag together the materials that were to be used in the building.

> "They dreamt not of a perishable home,
> Who thus could build;"

and, therefore, they succeeded in erecting an edifice that has been the wonder and delight of the world ever since. I know there are some who would ascribe all this to superstition, and

under the pretence of repudiating of that, would shelter their own penuriousness. Superstition be it! That only provokes the question, Is it to the credit of enlightened and intelligent piety that it should be outstripped by superstition in such a career?

With these views, my Lord and gentlemen, I cannot but wish well to this Institute, the members of which I have now the honour to address. Bringing together, as it does, the resources of science and experience, and not disdaining to receive suggestions from those who, destitute of such resources, can yet give utterance to the unsophisticated emotions of their nature, such an Institution appears to me to be full of promise for the best interests of Architecture in this country. In thanking you, therefore, for the kind courtesy with which you have listened to my very imperfect remarks, I will at the same time give utterance to the hope, that your Institution may long and greatly prosper; and that not only the advanced members of the profession shall continue to receive stimulus and aid from their connection with it, but that, under its fostering hand, not a few gifted youths may be encouraged to go forward in their course, so as to realize, in the fullest measure, the best results for the noble profession to whose interest it is devoted.

Transactions of the Architectural Institute of Scotland,
Session 1858–59.

No. II.

ON COTTAGES FOR RURAL LABOURERS.

by

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[*Read at a Meeting of the Institute, held at Edinburgh on 17th January 1859.*]

So much has lately been said on the subject of houses for the rural labouring population, as well as for the humbler classes in towns, that it almost seems presumptuous to offer anything new respecting it. At the same time, I feel it to be the duty of every one to bring at least his own experience to bear upon a matter so important as this undoubtedly is; and, on this ground alone, I beg to trouble you with a few remarks on Rural Cottages, suggested by what has fallen under my more immediate observation, during a residence of some years in Peeblesshire.

In offering these remarks, it is surely unnecessary for me to begin with any statement as to the value of proper house accommodation for rural labourers. On that point there is a

pretty strong and almost universal opinion; as is evidenced not more by the feeling of the press, than by the institution of a society of noblemen and gentlemen for the sole purpose of promoting improvement in Cottage Architecture. It is now freely admitted, that social well-being depends in no small degree on the nature of house accommodation; and, in short, that where there are great structural defects, there will, in all probability, be various moral imperfections. With this candid admission, however, it is found that, practically, the subject is environed with certain difficulties. We have to take into account not only the question of expense, but the previous habits and prejudices, and also the settledness of occupation, of the people. As regards even the multiplication of cottages, there will probably be objections; for, according to existing social arrangements, there is a visible declension of families among the rural labouring classes towards pauperism, which no one is very desirous of affording a permanent refuge. A philanthropist sitting in his study, and writing on this subject, is apt to forget another particular of no small moment,—I mean, the extent to which the occupant of a cottage is placed beyond the control of landlords. This, indeed, is the most important thing of all, and I shall endeavour to explain how it occurs.

You will understand that rural labourers are of two distinct classes. One consists of persons who are hired chiefly by proprietors to do work about their gardens, lawns, and forests, and to execute a variety of other jobs on their estates. The other class is composed of married farm servants, usually called hinds, with whom the proprietor has nothing to do in a direct manner. Over the one class he can exert a proper control; but the other is beyond his reach, or nearly so. Leaving out, in the meanwhile, any consideration of the class of hinds, I may commence by calling attention to the houses

of the jobbing labourers. These persons occupy houses which they rent direct from the proprietor or his agent, and are in all respects subject to such regulations as may be established for keeping things neat and ornamental about their dwellings. For this and other reasons, the cottage of the jobbing labourer may with advantage be of a superior kind. The landlord, his employer, perhaps takes a pleasure in seeing him cultivate flowers; and, on this point, a hint is enough to produce something pretty for the neighbouring flower-show. Yet, whatever be the tastes of landlords towards the ornamental, they are necessarily restrained by the consideration that, be the house of the rural labourer what you will, it cannot always yield a rent that will properly meet the outlay. In the district of country with which I am best acquainted, the ordinary annual rent of a cottage varies from L.2, 10s. to L.3,—the last mentioned sum being the most common. Both, therefore, on account of the poor return commercially, as well as the danger of introducing undesirable neighbours, a proprietor acting with discretion feels himself obliged to limit alike the number and the size of his cottages. He builds only what are necessary for the accommodation of the labourers whom he is likely to employ permanently; and, under this sort of necessity, he has often to be satisfied with a very inadequate recompense in the form of rent. He will likewise, for the same reasons, study to be as economical as possible in constructing his cottages. Unless for the sake of picturesque effect in a landscape, he will endeavour to avoid expensive details. As far as I am able to judge, houses of this kind have frequently been made too fine—much finer and larger than their occupants wanted. As a general rule, I should say that the sum of L.100 is enough to lay out, for all proper purposes, in building a house for a rural labourer.

The question, then, may be said to resolve into this: What

kind of a house can we get up for the sum just mentioned? For the sake of mutual warmth, and saving of gables, it is best to build not fewer than four cottages together in a row. The next thing is economy in preparing the site. I have learnt, by experience, that it is important to select a level space. A site on a knoll may be picturesque, but unfortunately it proves costly; if the ground be uneven, a heavy expense is incurred for excavation and surface deepening. It is likewise advantageous to select ground that is naturally dry, and from which a drain can be easily conducted. It is further of importance to be near a running streamlet of pure water, so that no pumps or other machinery will be required. Such are the leading requisites as regards situation, along, of course, with accessibility. If possible, the cottages should be built near a public road; so that the occupant can with little or no difficulty communicate with carriers, post-runners, and others with whom it is necessary to maintain frequent intercourse; and the arrangements should be such, that a cart with coal or furniture can be easily led up to the door. I have observed that there is much exhilaration in being near a public thoroughfare. It is next best to being in town. Old as well as young find it cheerful to see who passes. The young, in particular, shut out from the busy world, are improved by such opportunities of observation as are presented by the common road in front of their dwellings, or they are, at all events, by that means kept out of mischief. More than this, if the cottagers cultivate flowers in front of their doors, they learn to take a pride in making a good appearance. A few words in commendation of a rose, or a marigold, or a sprig of honeysuckle, will in this way work wonders. I have known a whole hamlet improved by a casual commendatory remark of a passing stranger. On these several accounts, I should advise that labourers' cottages be placed near a public road. I need

hardly add, that a sunny exposure is also of much value, physically as well as morally. No house should be built where the sun cannot shine daily in at the windows. A good exposure, other things being suitable, is that facing the south-west; for then the sun shines on the back of the house in the morning, and the east end and front about midday, and the west end in the evening. It may not be always practicable to give dwellings that exact position; but it can do no harm to say what is preferable as a general rule.

There is only one other thing I have to suggest as regards situation. Houses for all sorts of workmen and labourers should be situated at no great distance from the scene of their daily industry. It causes a great waste of time, and great inconvenience in many ways, to place a workman's dwelling a mile or two away from where he works; and I should be afraid that any scheme for getting up houses for the working classes of cities which aims at erecting dwellings out of town, will not prove acceptable to the parties interested. The barons of old quite understood this. At the end of the avenue leading to their mansions, they built a village expressly for their servants and retainers, who, besides being always at hand when wanted, experienced the benefit of a certain moral supervision. In short, I very earnestly deprecate all plans which have for their object the hustling of workmen and labourers out of sight in colonies by themselves, at an inconvenient distance from the scene of their employment, as well as away from the observation of those to whom, in cases of difficulty, they look for counsel, and whose least duty is to set them a good example. On this account I venture to say here,—though, perhaps, a little out of place,—that the scheme lately proposed, of building workmen villages miles from London, and which are to be reached only by railway, is socially and economically objectionable; and so, in my opinion, though in a less degree, is

the scheme of colonizing districts with workmen a little way out of Edinburgh, the older and central part of which is, in my opinion, so eminently adapted for houses for the manual labouring classes.

So much for situation: now for other particulars. As regards the construction of dwellings for rural labourers, it is not only necessary to consult economy in building, but in maintenance. We must do nothing to cause expenses for repairs. Now, if there be a picturesque porch or roof, or any other similarly effective details in an architectural point of view, or much exterior wood-work requiring to be painted, you at once cause undue outlay, and increase the risk of future expenditure. Any one who has lived for a series of years in a cottage villa in the country, will remember how frequent are the petty troubles and expenses incurred on account of chimney-tops, slates falling off, leaks at skews and roof gutters, stoppages of roans and rain-conductors by snow, and so on, not to mention painting of outside wood-work. Surely, I do not need to insist on the propriety of giving as little cause as possible for these petty outlays in connection with cottages let to a humble class of tenants.

As regards the amount of accommodation, it has to be kept in mind that the earnings of a rural labourer, taking the whole year round, are seldom more than 12s. to 15s. per week. It is tolerably evident that a person with these slender means cannot furnish and keep comfortable a house consisting of several apartments. Supposing that he is able to procure a sufficiency of furniture, we have next to consider how he can conveniently remove it from place to place, often at great distances from each other; for, as he has scarcely the means of hiring carts, he has for the most part to depend on borrowing. But there are questions more serious. Can he afford a fire in more than one room during a long winter and spring, when

it is taken into account that he is probably ten or fifteen miles from a coal depôt, and pays 15s. a ton for fuel? In fact, unless his family manage to gather sticks, he cannot keep up even one fire. As for artificial light, he burns candle only when he cannot help it; and the giving of candles to be burnt in a separate room is, according to his notions, altogether out of the question. The fire very frequently answers the purpose of a candle, particularly if a blazing bit of wood or parrot coal can be got hold of. Therefore, alike for the sake of warmth, light, and cheerfulness, the fire is a point of general attraction. The family lives at the fireside; and any spot away from it, however neat and pretty, is decidedly disliked. And can we wonder that such should be the case? We hear much of the importance of ventilation, and no one is more alive to its value than I am; but, unquestionably, warmth is of not less value in preserving health. In the cold and humid climate of Scotland, a proper degree of artificial heat is the grand desideratum, particularly in cases where there is any deficiency as regards the nature of food. It is very certain, that to insure a sufficiency of warmth, the humbler classes, in defiance of all remonstrances to the contrary, will not scruple to defeat any peculiar plans for free ventilation. Some proprietors in the Highlands have found a difficulty in introducing even daylight into cottages; for, as cold is readily radiated from glass, windows are viewed with considerable distrust. It is related that, in one instance, a family provided with an improved dwelling, actually turfed up the windows, closed the chimney, placed the fire as of old in the middle of the floor, and caused the smoke to escape by a hole made on purpose in the roof, all for the sake of heat. I mention this extreme case to show that proprietors aiming at improvement, would require to act with a prudent regard to the habits, not less than the available means, of those whom they intend to benefit.

Whether from inveterate habit, the necessity of warmth, or other causes, there is a universal tendency among the humbler classes in the rural districts of Scotland to live together in one apartment, which is used for cooking, washing, eating, and sleeping—the place in which all are born, live, and die. It has been the effort of all improvers to modify this custom, but with remarkably little success. Speaking from personal observation, I should think it scarcely possible to drive the people at once out of their fancy for living together. By giving more rooms than are wanted, you only provide places to be filled with lumber, or to be sub-let. A time may come when, by the progress of knowledge, tastes, and feelings, as well as by the possession of better means, the humbler classes in the country will aim at a more distinctive separation of their families. Let us all do what we can to facilitate this progress of manners,—not, however, by attempting any violent change of old usages, but by taking only that moderate step in advance which will be appreciated and found useful. Such at least being my own view of the subject, I some years ago built a row of cottages for rural labourers. I attempted nothing picturesque, or fine, or spacious, but just as nearly as possible that which was adapted to the position, means, and state of advancement of the intended occupants. I was my own architect, made out my own plans and specifications, and had the different parts of the work done by contract. The whole were finished to my satisfaction; and I now purpose to give you some account of this architectural effort of a non-professional.

The cottages are four in number, placed in a row, stone and slated, rough-cast with lime and sand, and possessing mutual gables. Properly speaking, each dwelling consists of but one room or kitchen; but over this there is a light garret-room, without a fire-place. The cause of this arrangement is

obvious. If I had given a separate room below, it would have been so cold that no one would have slept in it, and it would have been a mere lumber cellar, or been let as lodgings; and therefore, in either case, useless as a means of separation. By giving a small garret-room immediately over the kitchen, the objection against separating is partly removed. The garret participates in the warmth of the flues in the gable, as well as such warmth as is obtainable from the apartment immediately beneath. I would, however, say, that where circumstances render it expedient, a fire-place in the garret should be given. As it is, my plan has been perfectly successful. I find that some of the families put grown-up children to sleep in this upper room; though, I am also sorry to add, that in one instance, where the family is large and ought to be separated, the upper room has been occasionally let to lodgers,—so difficult is it, with all our contrivances, to induce the humbler classes to fall in with proper arrangements.

Entering one of these dwellings, we find ourselves in a porch lighted by a small pane of glass in the outer door. On our left is the stair leading to the garret; fronting us is a closet for tubs, pots, and other articles; and on the right is the door of the kitchen or living room. This is a comfortable-looking place, with walls and ceilings plastered, a fire-place, and a space for two beds. A door on one side opens into a good store-closet, which is lighted by a small window of four panes behind. One of these panes opens on hinges, and by it a draught of air can be sent through the house. This store-closet has accommodation for meal, potatoes, milk, and other articles; for it is cool and dry, and has several broad shelves. The fire-place of the kitchen is sufficiently spacious to admit of a girdle for baking. A grate, set as a fixture, is provided with an iron *swee*, without which no cottage of this kind is reckoned complete. In the ceiling are two

hooks for hams. The whole of this ground-floor is laid with square yellow tiles, which are dry, and neat in appearance.

Ascending to the floor above, we have first an open space lighted by a pane in the roof, and fit for receiving a bed if necessary. By a door in a partition we enter the garret-room which I have already spoken of. This room has two fixed beds under the slope of the roof. In front of the beds is a sky-light, which is on hinges, and can be held open by a quadrant and stud. The whole walls and ceilings of this garret-floor are plastered in a plain but substantial manner; and there is sufficient head-room to stand upright in the middle of the floor. I should mention that all the doors in the house are provided with plain thumb-snecks, made by a country smith. These, I find, are the best kind of latches for rural cottages, for they do not go wrong, and cost nothing for repairs. The roofs are slated with Welsh doubles, a good kind of durable slate; but if they can be easily got, I should prefer Scotch slates, as less likely to break and fall off. There are free-stone lintels and window-soles, also door-steps; and there are free-stone chimney-tops and copes, and free-stone skews. I am now inclined to think that the giving of free-stone skews was an error. They appear neat, and make a finished-looking job. Builders recommend them. But I observe that rain never drops from skews so well as from slates, and it does not seem clear that skews insure dryness to the roof. Were I to build more cottages of this kind, I would give no skews, but just carry the slates to the outer edge of the gables, and fill in the interstices with plaster. I chance to possess a house of an old date, which has no skews; and yet it is as sound as if it had been recently erected. In a word, I look upon skews for cottages as costly finery, doing as much harm as good. In old times in Scotland, buildings were contrived so as to cause the least future derangement and expense. The old lairds

incurred no bills for a number of things chargeable against a modern mansion. Roofs were made with an abrupt slope, to throw off snow and rain. The water which fell, dripped from the slates, and disappeared the best way it could. We cannot, with a better knowledge of sanitary affairs, follow the old simple practices. Even cottages must have roans and rain-conductors. These, at all events, I gave to the row of cottages in question; and thus at some expense the whole are kept perfectly dry.

At the distance of ten feet in front, I made a drain, nine inches square, laid with slate flags above and below, and built with stone and lime in the sides. Opposite each door a grating was placed over the drain, to receive slops from the house. To keep this drain clear, I led a streamlet of water to the higher end; there spouting in a continual flow, it is used by the cottagers,—the overplus, which runs night and day, falling into a grating and flowing through the drain. This in itself is an important arrangement for health and cleanliness. I observe that in some published plans of a humbler class of cottages, sinks are put in the kitchen or scullery. That I distinctly object to. Sinks in such houses are expensive, they are liable to get out of order, and they may become offensive. Looking at the habits of the occupants, there is nothing so serviceable as gratings outside for all sorts of slops.

At the back of the cottages, each is provided with a privy and ashpit, not close to the back wall, but adjoining the boundary wall, which is fourteen feet distant. In this back area there is plenty space for pig-houses, and for stowing away coal and firewood. Before building the cottages, I made some inquiry as to the acceptability of privies, and found that nobody wanted them. The people had never possessed anything of the kind; and I am almost of opinion they did not know how to use them, and had some reluctance

about the responsibility of keeping them permanently clean. I had, indeed, been greatly disappointed in a previous attempt. Yet, failing in this first effort to introduce cleanly habits, I did not altogether give up hope, and thought that I should make further trials. Accordingly, I gave the proper conveniences to these cottages, notwithstanding that the tenants would greatly have preferred pig-houses, and been quite contented with a dung-hill. Nor have I reason to regret this step: the places are, I believe, kept tolerably clean; and, at all events, the people are in the way of being educated into better notions and habits.

By affording space behind for coal and firewood, the front is kept in proper order. Beyond the paved passage in front, which is wide enough for a cart, stretch the gardens of the cottagers, with a stripe of greensward for bleaching clothes, —the whole possessing a neat and inviting appearance. Some of the cottagers have a fancy for cultivating flowers, which I endeavour to encourage; and all have a stock of bees. Occasionally, they get prizes for their flowers and honey at the annual exhibitions in the neighbourhood. Looking at the entire result, these cottages have realized the expectations formed respecting them. For the part of the country where they are placed, and for the class of persons who are to occupy them, they are exactly the thing. They are not too large nor too fine, neither are they too small. They are neat, without being costly; plain, but environed by trees and flowers, not unattractive. The occupants like them exceedingly, and speak of their superior convenience. If they were larger, and provided with a separate scullery and washing-house, as is projected for some varieties of labourers' cottages, they would prove inconvenient, and be objected to. In building cottages of this nature, it is always important to economize roofing, which is a heavy item of

outlay. This I made a special object. Each house covers nearly a square, or about 23 feet 7 inches by 20 feet 3 inches, outside measurement. The method of imparting sufficient accommodation within this limited ground space, consists, of course, in adding to the height. But to give a foot or two of more wall is of small account, in comparison with the cost of roofing. Obvious as is this fact, it seems desirable to call attention to it; for no error is more common than that of building cottages over too large a space, thereby greatly adding to the expense of roofage.

The dimensions of the cottages will be seen from the ground-plans, sections, and general view, to which I beg to direct your notice.[1] The length of the entire row, outside measure-

General View of Cottages.

[1] Mr Chambers here pointed to certain large drawings on the walls. These, of course, we cannot reproduce; but, in their stead, offer a wood-cut, illustrative of the general view of the cottages; and, at the conclusion of the paper, wood-cuts, illustrative of ground plan and sections, are also given.

ment, is 94 feet 6 inches; breadth, 20 feet 3 inches. The size of the kitchen, within, is 16 feet by 12 feet 3 inches; the greatest breadth being from front to back, so as to allow the two beds to face the window, and admit an entrance to the store-closet. The height of the kitchen is 8 feet. The garret-room is 12 feet square, including beds. The height of wall outside, from ground to slates, is 10 feet 6 inches. Not an unusual height of wall in rural cottages is 9 feet; but this produces a very low garret, which is poor economy. As the roof is the same cost over a low as over a high cottage, I should recommend a height of not less than 10½ feet; which, however, is enough. Taking off 6 inches for height of door-step, and 8 feet for height of kitchen, we are left 2 feet to be thrown into the garret; and these 2 feet, with the rise of the roof, give sufficient standing room in the middle of the garret-floor. By this trifling addition of 1½ feet to the ordinary height of walls, we in reality get a comfortable little room for the accommodation of grown-up children, instead of a close, dark, and miserable *bawks;* and, for the sake of warmth, as already mentioned, a small sleeping apartment overhead is infinitely preferable to a side-room on the ground-floor. Should it be preferred, however, a bed-closet could be given below without any material structural alteration. The plan, you will observe, admits of this simple modification. We have only to use the space for one of the beds as a small store-closet; and then devote the present store-closet to the purposes of a bedroom, going through the store-closet into the sleeping place. This change, I say, could be easily effected, if absolutely required; but I am pretty sure that it would not be at all popular. A second bed in the kitchen for young children, in order that they may be conveniently looked after, is reckoned a sort of *sine qua non*, which cannot be altogether disregarded.

How far these cottages have answered as a commercial speculation, remains to be noticed. Being on my own property, the ground cost nothing; there was, however, some expense for excavation, as the site was unfortunately on a brae, which had to be levelled. There was likewise some expense for boundary walls to the gardens, and to the area behind the cottages; the causewaying and draining also caused an outlay. Deducting these and some other extras, I reckon that the final cost per cottage was about L.100. But I need to explain that the lime, timber, and slates had to be brought a great distance by carts, and that the ruble was blue whinstone, which it is costly to build. My belief is, that cottages of this kind could be built near Edinburgh, for each, L.8 or L.10 less; yet, admitting this to be the case, there must necessarily be extras, for boundary walls and drains; and I think that from a hundred to a hundred and ten pounds per cottage, all things considered, would be a fair allowance. Besides being more cheaply executed near Edinburgh, such cottages would let better than in a thinly populated district. Near town, a landlord would get L.5 or L.6 a-year for them; whereas the highest rent I can realize is no more than L.3 per annum. But, as may be supposed, these dwellings were not built as a pecuniary speculation, but to afford houseroom to a class of labourers whom it was convenient to employ less or more in the neighbourhood.

Whether cottages, with the same extent of accommodation and means for exterior neatness, can, with advantage, be built for farm hinds, is a question to be determined by circumstances. The hind is the hired servant of the tenant-farmer, and consequently in no respect subject to the interference of the landlord. He may be hired for his bodily strength and skill, without any regard to moral qualities, or as to whether he will keep his dwelling neat and orderly, let

alone ornamented. Practically, the proprietor has nothing to do with the houses of farm-servants, further than to provide a certain number along with other farm-buildings. From the movement which has lately taken place among landlords, it is gratifying to observe that, though exempted or prevented from exercising any control over the management of hinds' houses, they are voluntarily undertaking the improvement of this class of rural dwellings; and the fact is more worthy of notice, that the movement does not seem to receive any marked impulse from the demands of the tenant-farmers. It seems reasonable to conclude that, until landlords have the warm co-operation of their tenants, we can expect no universal change for the better; for there always will be proprietors who, unless urged by some sort of special inducement, will refrain from making suitable repairs on the dwellings connected with their farms. I could mention the name of a farm which was let two or three years ago at a rise of rent. The proprietor is wealthy, with numerous examples of improvement in the neighbourhood; yet he allows the hinds' houses to be on the lowest scale of comfort and accommodation. The floors are of clay and very damp. All about the doors is a litter of dung-hills, pig-styes, and piles of coal and firewood. The thing is a public scandal; but, as the farmer makes no complaint, it may be presumed that the landlord finds it more agreeable to keep his money than to spend it Quixotically, as he would perhaps think, in transforming an unsightly clachan into a hamlet of wholesome and attractive rural dwellings.

It is necessary to make these explanations, in order to show that, unless influenced by their feelings, landlords are not likely to incur expense on account of hinds' houses. Abandoned for the duration of a lease to a person who sub-lets them, and probably cares nothing at all about the way they

are kept, it would be ridiculous to lay out money in making them picturesque. If they offer the accommodation of the row of dwellings which I have described, they will be sufficiently commodious. Something inferior, however, would in many instances be found answerable, particularly if it be a question of repairs. Two years ago, I set to work to repair and render comfortable, in an economical way, a row of five hinds' houses, built of stone and slated, and too good to be pulled in pieces. As they stood, when I came into possession of them, these houses had the usual kind of damp earthen floors. In one of the houses, the people laid down pieces of wood to stand on, and keep their feet out of the wet; and this, through various changes of tenants, had been going on for forty years. The dwellings were of course unwholesome. Rheumatic complaints prevailed; and by a fever of this kind one of the hinds died, leaving his widow and family chargeable to the parish. What I did in the way of remedy was this. A radical evil consisted in a wet bank of earth which pressed against the back wall to a height of four feet. I dug this earth entirely out to the foundation, which I partly underfooted, and left a clear area of six feet wide the whole length of the row. Underneath a retaining dry-stone wall I put a drain, to catch and carry away all the water that poured from the bank. It may be useful here to mention, that for keeping roads and areas dry near sloping banks, I have found no drain so sure and effective as that beneath a dry-stone retaining wall. The water dripping from the bank seeks its way into the drain, and all remains dry outside. Besides adopting this expedient, I gave the cottages roans and rain-conductors, which communicate with the drainage. Inside the cottages, I cleared out two feet of earth, and laid down wooden floors. At the same time, I altered the partitions, and gave precisely that kind of arrangement as regards closets which was found so suitable in

the new cottages. I likewise gave to each dwelling a trap-stair to the garret, which was a novelty in the district, where the common means of access to garrets in hinds' houses is by that most objectionable method, an open moveable ladder. As the walls were rather low, I could not make garret-rooms. Still, by raising the cross rafters, and putting in sky-lights, I so far improved the garrets as to render them available as sleeping places for a grown-up son or daughter; and, in point of fact, I slept in as circumscribed garrets myself when I was a lad, and am not a pin the worse for it.

So improved, these cottages are admitted by their occupants to be exceedingly comfortable. As in the case of the newly built cottages, they have a neatly causewayed space in front, with gratings over drains, and a constant run of pure water. Although making no pretensions, these hinds' houses are among the best in the neighbourhood. As I have been so fortunate as to enlist the good feelings of the tenant-farmer, and as his servants are steady, well-conducted persons, I have no fear of things getting into disorder.

In concluding these observations, I need scarcely remind you that all varieties of rural labourers are the better for being occasionally visited and talked to by their landlords, or by members of the landlord's family; and I can truly say, to the credit of the Lowland Scottish peasantry, that they appreciate civilities of this kind, and are anything but obstinate in resisting obvious improvements in and about their dwellings. At the same time, I feel that it does not do to enforce refinements and niceties to which they are not accustomed. We must take them gradually, not abruptly; leaving to the next generation various little amendments which cannot with prudence be executed in the present day.

For those who wish for practical information, I offer, by way of appendix, the following

SPECIFICATIONS FOR ERECTING FOUR COTTAGES AT GLENORMISTON, ACCORDING TO PLAN.

MASON-WORK.

1. Cottages to be in a line, built with stones and lime, and slated. A gable at each end of the line; contractor to find the stones, and all other materials.

2. Foundations of the cottages to be taken out to a proper level; lowest house in the line to have two freestone steps, and the second lowest, one step outside of door.

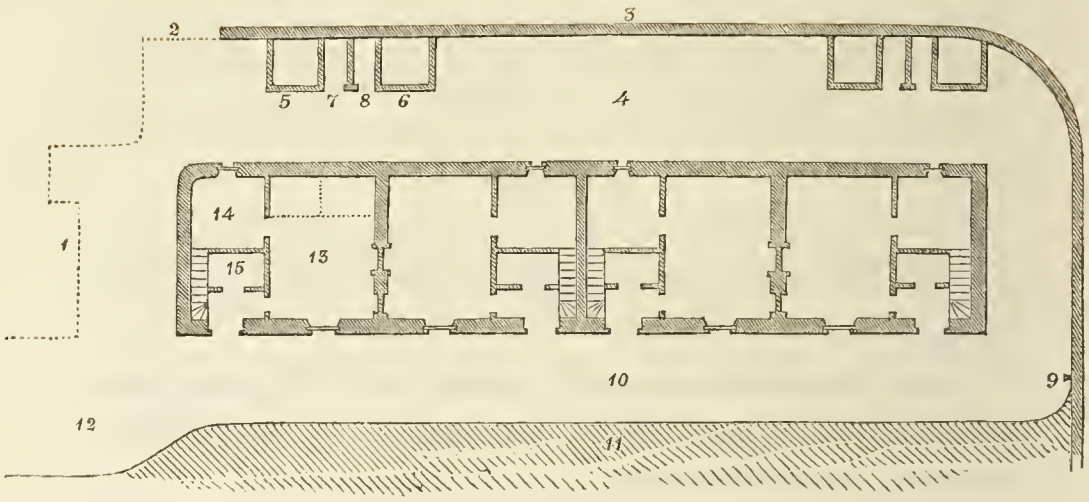
3. Walls to be 2 feet thick, with 8 bolls of lime to the rood, and all built clean for rough-casting outside. Side-walls to be 10 feet high from floor. Joists to be built in, to leave one foot clear from wall-tops.

4. Freestone lintels and soles for doors and windows. Freestone skews to gables. Freestone corners and copes for chimney-tops, copes to be batted together with iron bats, run in with lead; each chimney to have a white clay-can on top.

5. Partitions with standards to be built with dwarf-walls for the same.

6. Each fire-place to have an outer and inner hearthstone, and freestone jambs and lintel, with built grate.

7. Floors to be laid with thick yellow tiles, bedded in lime—the ground to be properly levelled to receive the same; outside of walls to be properly rough-cast, with plaster finish at sides of doors and windows; walls to be ready to receive roof on 15th of December 1853.



EXPLANATIONS.

1. Previous erections.
2. Gate into plantation.
3. Boundary wall, stone and lime, copped with hammer-rounded stones.
4. Open space causewayed, sloping from cottages to gutter; this open space 14 feet wide.

5, 6. Ash-pits, each 6 feet square inside; surrounded with stone and lime walls, 4 feet high; paved; and walls copped with hammer-rounded stones.

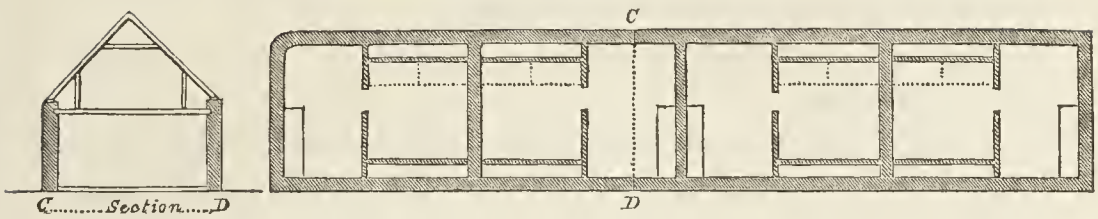
7, 8. Conveniences; roof slated; doors with small pane of thick glass near top; an opening into ash-pit. Similar erections at other end.

9. Spout of water over drain.
10. Space in front of cottages, 10 feet wide; causewayed.
11. Gardens, with a facing of green bank on which to bleach clothes.
12. Wide causewayed space, where a cart may turn, in approaching from public road. Here manure may be wheeled out for removal, or coal taken in.

RANGE OF GROUND FLOOR OF COTTAGES, ALL ALIKE.

13. Kitchen. 14. Store closet. 15. Small closet opposite the door. Stair partly over the closet.

SECTION OF THE BUILDING, WITH GROUND PLAN OF UPPER FLOOR.



JOINER, PLUMBER, AND PLASTER WORK.

1. Safe lintels over windows and outer doors to be 3 inches thick; 9 inches of wall-hole, and of sufficient breadth. Joists to be of white baton, $6\frac{1}{2}$ by $2\frac{1}{2}$ inches, placed 18 inches between the centres, and to have 12 inches of wall-hole. Joists all to be dwanged.

2. Roofing.—The cupples to be of white baton, $6\frac{1}{2}$ by $2\frac{1}{2}$ inches, and placed 18 inches between centres. Wall-plate to be $6\frac{1}{2}$ by $1\frac{1}{4}$ inches, to be properly nailed to dooks in wall-head. Sarking to be four-clift white plank, or three-clift baton, to be properly nailed with three nails into planks, or two into batons, and to have a proper ridge-baton, and to be covered with zinc; zinc roan along the front and back, with two iron conductors in front, and two in the back.

3. Two fixed beds in upper-room, and lined with $\frac{1}{2}$-inch deal inside. Garret-room to have skirting 4 inches all round. Upper room to be standarded, and lathed, and plastered, laid with $\frac{3}{4}$-inch flooring, grooved and tongued. To have a fixed skylight of thick glass in roof over stair-head. To have a hatch-window in roof of garret-room, in front, to be properly done with lead round the frame; also hinges and fixing. Stair from lower floor to be $\frac{7}{8}$-inch white deal, and to have proper string-boards. A small handrail round top of stair.

4. Built partitions to have standards $4\frac{1}{2}$ by 2 inches plank, 2 feet between centres, and to have proper warpings 20 inches apart. Facings to be $3\frac{1}{2}$ by $\frac{1}{2}$ inch thick; and to have two beads, and put up and plastered in.

5. Inner doors to be plain deal, $\frac{3}{4}$-inch thick, with three bars, and properly nailed, and to have sufficient caps.

6. Wall-presses to have four shelves, $\frac{7}{8}$-inch thick. Store-closet to have four shelves; two of these 14 inches broad, $\frac{7}{8}$-inch thick, and two 1 foot broad and $\frac{7}{8}$-inch thick.

7. Windows to be 2 feet 9 inches by 4 feet 6 inches, with sashes glazed with best crown-class. Small window in store-closet to be 17 inches by 22 inches; one pane to be of wood on hinges.

8. Windows to have frame-shutters and back folds. Two iron hooks in roof of kitchen.

9. Outer doors to be made of red deal $1\frac{1}{8}$-inches thick, and to have proper checks, with good stock-locks and thumb-snecks; good strong hinges. All the inner doors to have thumb-snecks, except wall-press doors, which are to have good press-locks and knobs. A small pane of thick glass, 9 by 5 inches, in door, near the top.

10. Ceilings to be lathed, and the place for the beds in kitchen to be lathed down to a proper height to receive beds.

11. Plaster-work.—All the lime to be well haired and properly wrought and matured before being put on. Ceilings and other lathed parts to have two coats; and all the walls and built partitions to have one coat and a rub in.

12. Slater-work.—The roof to be covered with best Welsh doubles, and well bedded with lime, and all to have proper cover double nails, neatly pointed at chimney-tops and skewers.

13. The whole to be finished, walls and plaster dry, and the houses ready for occupation by the 1st day of March 1854; and the whole to be done in a satisfactory and tradesman-like manner, to the satisfaction of Mr Chambers, or any inspector he may appoint. The work will be paid for by instalments, if required; at least 10 per cent. of the price of the work done being retained till the end of the job.

Transactions of the Architectural Institute of Scotland,
Session 1858–59.

No. III.

ON THE

TRIUMPHAL AND MONUMENTAL PILLARS AND ARCHES OF ROME.

BY

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OF BANCHORY.

[*Read at a Meeting of the Institute, held in Edinburgh on 9th February* 1859.]

It is remarkable that the two finest pillars ever erected in Rome, those of Trajan and of Marcus Aurelius (commonly called that of Antoninus by mistake), though both built of blocks of stone, have survived all the assaults of man and of time, which have proved fatal to so many more substantial erections, and still stand almost exactly as they were at first erected.

The Pillar of Trajan stood in his magnificent Forum, of which it was no unworthy ornament. It was erected, as the inscription declares, by the Senate and people of Rome, for the double purpose of doing honour to Trajan, and of pointing out the height of the hill which had been cut down to make

a level space for the Forum Trajanum. The inscription on the base still remains.

SENATVS. POPVLVSQVE. ROMANVS
IMP. CAESARI. DIVI. NERVAE. F. NERVAE
TRAIANO. AVG. GERM. DACICO. PONTIF.
MAXIMO. TRIB. POT. XVII. IMP. VI. COS. VI. P. P.
AD. DECLARANDVM. QVANTAE. ALTITVDINIS
MONS. ET. LOCVS. TANT*is*. *ope* RIBVS
SIT. EGESTVS.

It will be noticed that it does not so much commemorate the glory of the Emperor, as the labour of cutting down a portion of the Quirinal Hill.

The Pillar is of the Doric order, composed of 34 blocks of white marble, which are said to be dovetailed into each other. Of these blocks, eight form the pedestal, one the toro, twenty-three the shaft, one the capital, and one the pedestal of the statue ; the total height to the top of the statue is 194 palms, or 130 feet. The pedestal is 22 palms, or 15 ft. 6 in. high ; the toro, or zoccolo, 4 palms, or 2 ft. 10 in. ; and the column and capital, 131 palms, or 92 ft. 9 in., and the pedestal of the statue, 20 palms, or 14 ft. 2 in. On this pedestal stood originally the statue of Trajan, with a gilt or golden globe in its hand.

This statue perished long ago, and in its room we now have one of St Peter in bronze, 16½ palms high, or 11 ft. 6 in.

There is an interior stair cut out of the solid blocks of marble, of 185 steps, lighted by 43 very narrow windows : the staircase turns round twelve times in the ascent. From the ground to the top of the pillar, is 157 palms, or 104 ft. 9 in., which gives a rise of about 7 in. to each step.

At the bottom, the column is 16 palms, or 10 ft. 8 in. in diameter ; and at the top, 14 palms, or 9 ft. 4 in.

It will be observed that a few letters of the inscription have

been effaced, evidently to make a niche for the reception of the sloping roof of some paltry dwelling of the Middle Ages; and with this exception, and the change of the statue on the summit, the Pillar stands exactly as it did in the year 116 of our era.

The four sides of the base are richly ornamented with military trophies. The toro is sculptured so as to form a laurel wreath, the leaves lying so close together as to occupy the whole of its surface.

The Pillar is entirely covered by bassi relievi, representing the principal events in the wars of Trajan against the Dacians.

This is in itself an extraordinary work, and of great value, from the many perfect illustrations which it furnishes of the dress, the weapons, and not a few of the customs, both of the Romans and of the Dacians in the time of Trajan, and it is of great value also as a work of art: the designs are invariably spirited, and the execution good, while the preservation is wonderful.

The figures are contained in a spiral which makes twenty-three turns round the Pillar; and it is asserted that there occur upon it no less than 2500 separate figures of men, besides horses, armour, and other objects: a slight cord separates the turns of the spiral. There is so much similarity in the whole sculpture, that it is evident that the design was the work of one mind, although many hands must have been employed in the rapid execution of the work.

The architect of the Pillar was Apollodorus, who also planned the Forum and many other works for Trajan.

The Pillar stood in the centre of a court in the Forum, and must have been a remarkable ornament even in the midst of its splendours. The excavations are not sufficiently complete to show the exact position which it occupied relatively to the

whole Forum; but it was probably near the centre, although it stands at one end of the present excavations.

It appears that, somehow, though we cannot tell why, this Forum and its buildings escaped the ravages of the first destroyers of Rome; for Cassiodorus, who wrote about the year A.D. 500—after the attacks both of Alaric, A.D. 410, and Genseric, A.D. 455—speaks of it in terms which seem to imply its complete preservation. "The Forum of Trajan is a miracle, even if inspected with minuteness."[1]

Ammianus Marcellinus describes the impression which it made on the Emperor Constans, on entering Rome, A.D. 356. "When he arrived at the Forum of Trajan,—a building unrivalled under the whole heavens, as we think, and worthy of being admired even by the gods,—he was wholly amazed, contemplating the gigantic edifice which could neither be described in words, nor again imitated by mortals. Giving up, therefore, every hope of making such an attempt, he declared that the only thing he could and would imitate, was the Horse which bore the statue of Trajan, in the centre of the court. Hormisdas, the Persian prince, who was near him, exclaimed, 'First, O Emperor, order a stable like this to be built, if you can; and may the horse you purpose to execute, succeed as completely as the one we see.'"[2]

[1] Trajani forum, vel sub assiduitate videre, miraculum est.—*Cassiod.* Var. vii. 6.

[2] Verum cum ad Trajani Forum venisset, singularem sub omni cœlo structuram, ut opinamur, etiam numinum assensione mirabilem, hærebat attonitus, per giganteos contextus circumferens mentem, nec relatu ineffabiles, nec rursus mortalibus appetendos. Omni itaque spe hujusmodi quidpiam conandi depulsâ, Trajani equum solum locatum in atrii medio, qui ipsum principem vehit, imitari se velle dicebat et posse. Cui prope adstans regalis Hormisda, ... respondit Ante inquit Imperator stabulum tale condi jubeto, si vales; equus, quem fabricare disponis, ita late succedat, ut iste quem videmus.—*Aur. Marc.* xvi. 10.

Trajan, on account of his general character, and in spite of his celebrated letter to Pliny against the Christians, was a great favourite with the Church of Rome; and to this, probably, we owe the safety of his Pillar.

There is a strange story given in the Life of Pope Gregory the Great, and long firmly believed in Rome, though in modern times discussed with much bitterness by Tiraboschi, to the effect that Gregory so greatly admired his character, and shed so many tears over him as to quench the flames of hell; and at length it was revealed to him that Trajan was liberated from its torments, but only on condition that Gregory should never again intercede for a Pagan.[1]

The same story is alluded to by Dante in the Purgatorio:—

> "Quivi era storiata l'alta gloria
> Del Roman Prince, lo cui gran valore
> Mosse Gregorio alla sua gran vittoria
> I' dico di Trajano imperadore:
> Ed una vedovella gli era al freno
> Di lagrime atteggiata e di dolore."
>
> —*Purgatorio*, Cant. x. l. 73.

Though the story is thus introduced as a fact in the Purgatorio, yet in his Paradiso, Dante again refers to it, and denounces it as an old woman's tale:—

> "Favoletta di vecchiarelle."—*Parad.* xx. 47.

Another version of the story is, that it was revealed to

[1] "Virtutis ejus, Trajani, legitur commendasse Sanctissimus Papa Gregorius, et fusis pro eo lachrimis, inferorum compescuisse flammas. . . . . Fertur autem beatissimus Gregorius Papa tamdiu pro eo fudisse lacrimas, donec ei revelatione nuntiatum est, Trajanum a pœnis Inferni liberatum, sub ea tamen conditione, ne ulterius pro aliquo infideli Deum solicitare præsumeret."—*Tiraboschi*, vol. iii., pp. 113, 114.

Gregory that Trajan would be admitted to heaven if he would do sufficient penance for him, either in this world or the next; and that the Pope wisely preferred to undergo his penance in this life, and accordingly suffered much sickness during the rest of his earthly pilgrimage. Both tales are abundantly absurd; but they show clearly a special and enduring interest in Trajan and his character in the popular mind of Rome, and so far may account for the early care taken of his monument.[1]

In the twelfth century, we find that the property of the column was conveyed by the then Roman Senate to the monks of the adjoining monastery of St Ciriacus; and at the same time an edict was published, declaring that whosoever injured it should suffer death and have his whole property confiscated.[2]

In the course of time every other part of this Forum was overturned, the massive pillars of granite broken, and the area gradually covered with rubbish to a height of about twenty feet, so as completely to conceal the basement of the pillar, and the whole space seems to have been occupied by buildings.

In 1590, Pope Sextus V. cleared away the immediate vicinity of the basement down to the original level; but it was not till 1812–13, during the occupation of the French, that the Forum was cleared out as now seen, forming a space of 330 ft. by 143; and even as it is, there must be a large portion, perhaps two-thirds, still under ground. The prospect of an entire clearance is rendered very distant, by the existence of two singularly tasteless churches on part of the area.

The Pillar, however, can now be tolerably well seen in

[1] See notes on the passages in the edition of Divina Commedia printed at Padova, 1822, 5 Vol.

[2] Nardini, ii. 242.

every direction; and the effect of it is greatly enhanced by fragments of many of the ancient granite columns, now replaced on their bases, though only a few feet in height. They are all about 3 ft. 6 in. in diameter, and indicate, not obscurely, the great magnificence of the entire structure. The ancient pavement, of large slabs of rare and beautiful marbles, still remains. Two of the granite fragments are much larger than the rest, being 5 ft. 9 in. in diameter; these must have been portions of pillars at least 50 feet in height, if of the Doric order, and nearly of the same size with those of the Portico of the Pantheon.

The sculptured figures on the Pillar deserve the careful examination both of the antiquary and of the artist.

On the lower part of the Pillar, the belt, as it may be termed, which contains them, is about two feet high; but it increases as it ascends, and at the top is nearly three feet,—thus making the upper figures much more distinct than they would otherwise have been.

The figure of Trajan occurs about 50 times. One of the most interesting is that of Decebalus, the unfortunate Dacian monarch, putting himself to death, and another represents the revolting ceremony of presenting his head and hands to the conqueror. There is a beautiful series of drawings of the whole, by Julio Romano, preserved at Modena. They have also been very carefully drawn and engraved by Santo Bartoli, Piranesi, and others; and, in truth, it is much easier, and more profitable, to study the details in their pages than on the column itself.

We cannot but regard the labour bestowed on this exquisite work as very nearly thrown away. Standing at the foot of the column, or at a short distance from it, the figures of the few lowest spirals may be seen distinctly enough; but to make out the consecutive history, the spectator must walk twenty-

three times round and round it, and follow the spiral as best he may,—a task which very few persons will find themselves able to accomplish. It is remarkable how much more distinct the intaglios of an obelisc are than the bassi relievi of a pillar, owing to the sharper outline of the former, cut perpendicularly into the stone, and therefore casting the strongest shadow possible.

At a very moderate distance, the figures cannot be clearly distinguished; and at a distance of two or three hundred yards, the only effect produced, is that of a rough unpolished pillar. The same labour bestowed on an internal frieze would have been infinitely more instructive and valuable.

The spiral and the sculptures effectually conceal the joinings of the blocks of marble, and the whole appears to be one unbroken mass.

The Forum was constructed by Trajan for the use of the people, and perhaps, also, with some view to his own glory: the Pillar was erected by the people, or rather the Senate, in honour of the Emperor, but he never saw it. It was erected, as the inscription tells us, in the 17th year of his reign (A.D. 116); and he was then absent in his wars against Parthia and Armenia, from which he never returned, having died of fever at Seleucia in A.D. 117. His ashes, however, were brought to Rome, and by special favour were deposited, according to some writers, in a golden ball held in the hand of his statue on the summit; according to others, in the base of the Pillar. The honour thus done to Trajan has been already noticed in the paper read to the Institute on Roman Tombs. The fact is asserted by Eutropius, lib. viii. c. 2: "Solusque omnium intra urbem sepultus."

The Pillar stood in a small but richly adorned court; and on either side of it were the apartments containing, at one time, the celebrated Ulpian Library. Aulus Gellius speaks of

W. H. Mc Farlane, Lith^r Edin^r

Jupiter Pluvius from Colomn of Aurelius. — After Bellori.

sitting there and reading the Edicts of the ancient Prætors;[1] and it is interesting thus to identify, as it were, with this noble monument the author of the most amusing Common Place Book of antiquity.

COLUMN OF MARCUS AURELIUS.

This Column was erected only about eighty years after that of Trajan, viz., A.D. 195; but both the design and the details equally show the rapid decay of taste during that short period.

Like Trajan's, it remains as erected, but its preservation is less perfect. It probably occupied a position in the Forum of Aurelius, of which no traces are now visible, corresponding to that of Trajan in his Forum.

It stands in the middle of the modern Piazza Colonna, and is very well seen in every direction.

It is of the Doric order, and built of twenty-eight blocks of white marble; and the total height is 217 palms, or 153 ft. 8 in. The diameter at the base is 17½ palms, or 12 ft. 6 in.

The basement of the pedestal, now buried out of sight, is 16 palms, or 11 ft. 4 in.; the pedestal, 33 palms, or 23 ft. 4 in.; the toro, 3 palms, or 2 ft. 1½ in.; the column, including base and capital, 129 palms, or 91 ft. 6 in.; the pedestal and base of statue, 17 palms, or 12 ft. 2 in.; and the statue of St Paul, who now occupies the place of Aurelius, 19 palms, or 13 ft. 7 in. It will be seen that, on the whole, the dimensions and the proportions are very nearly the same with those of Trajan's Column, the principal difference being the greater height of the pedestal in that of Aurelius. It has a spiral staircase inside, of 190 steps, which is lighted by forty-two narrow

[1] "Edicta veterum prætorum sedentibus forte nobis in Biblioteca Templi Trajani."—Lib. xi. c. 17.

windows, which seem nearly to front the four cardinal points. This stair is not in good repair, and cannot be ascended without difficulty.

The exterior is completely covered by a spiral band containing a series of bassi relievi, representing the events of the war of Aurelius against the Quadi.

The spiral makes 19 turns round the Pillar; and the figures are less distinct than on Trajan's, but they are quite as numerous, and with the same variety of men and horses, weapons and bridges.

One groupe on this Column has given rise to considerable discussion, and even controversy,—that known by the name of Jupiter Imbrius or Pluvius, represented in Plate I.

The Christian version of the tradition is, that at one time during the war the Roman army was surrounded by the Quadi, and ready to perish for want of water, and that a copious supply of rain was given in answer to the prayers of a Christian legion in the army.

The heathens, on the contrary, attributed their relief to the exertions of certain Egyptian sorcerers in the army, and to Jupiter. A groupe is pointed out as representing the scene, though in truth it is not easy to make it out.

The principal authority in favour of the Christian tradition, is a letter professing to be written by M. Aurelius to the Senate, which distinctly attributes the deliverance of the army to the intercession of the Christians. It is often printed along with the Apology of Justin Martyr, and it is also printed by Baronius in his Annals (An. 179); but the style is so unclassical, that it is impossible to believe it to be of a date approaching to the age of Tacitus.

Eusebius states that there was in the army a legion composed of Christians from Mitylene, at whose intercession the rain was sent, and that they thenceforward were distinguished

by the name of "Legio fulminatrix;" but we know that there was a legion bearing that name as early as the days of Augustus.

The story is in itself interesting to the Christian, and there is a natural inclination to believe it; but the prevailing opinion of late is, that the letter of Aurelius is spurious; and, if so, the whole tradition must fall to the ground. Mr Newman has endeavoured to restore the credit of the miracle, in his translation of a part of Fleury's Ecclesiastical History (Oxford, 1842), with little success. In the seventy-first Book of Dio Cassius,[1] the Christian version of the story is given; but this is not, in truth, the work of Dio Cassius, in the second century, but of Xiphilin, in the tenth, and the passage is probably copied from Eusebius.

If there be any truth in the tale, the effect it had upon the philosophic Emperor must have been very transient. The war with the Quadi, during which the miracle is said to have happened, took place in A.D. 174; and Aurelius had commanded the murder of the venerable Polycarp seven years before, A.D. 167, and three years after, A.D. 177, he perpetrated, or allowed to be perpetrated, the fearful persecutions of the Christians at Lyons and Vienne—thus pursuing the same line of cruel conduct, notwithstanding his alleged gratitude to the Christian Legion.

Much as we would like to believe the story, and identify the figure of Jupiter Pluvius with it, we fear it must be added to the list of lying wonders which have so grievously disfigured the pages of Church History. Perhaps the strongest argument against the whole story is, that lately a groupe very similar, if not identical, has been pointed out on the Column of Trajan, and regarding his expeditions no such story is told.

The groupe occurs on the side of the Pillar towards the

[1] P. 806, Ed. Han., 1606.

Corso, above a bridge of boats in the fifth turn of the spiral; and it is said by the heathen party to represent Jupiter pouring down rain from his head and arms, with men and animals crowding to partake of the refreshing stream; but it certainly requires a little imagination to read the story on the sculptured Column.

The inscription now on the base is modern and erroneous, put up by Sextus V., when he repaired the whole structure.

The Pillar was then supposed to have been constructed in honour of Antoninus Pius, and so the inscription asserts. But the real Column of Antoninus was afterwards discovered and broken up (as noticed in our paper on Obelisces); and an ancient inscription regarding this Pillar is now in the Great Hall of Inscriptions in the Vatican, according to which Septimius Severus gives to one Adrastus, the Curator of it, permission to erect a house near it, and there it is expressly named Columna Divi Marci.

The band or belt which separates the rows of figures is much deeper than that of Trajan's Pillar, and the effect is very injurious, by giving at once the idea of so many separate stones placed in such a manner upon each other as to be very likely to slip off, and nothing can be further removed from the idea of stability, so necessary to the good effect of a column.

The whole details are inferior to the model from which it was copied.

COLUMN OF PHOCAS.

Near the middle of the Forum Romanum stands a solitary fluted Corinthian column of white marble.

Fifty years ago, the level of the ground concealed the basement and pedestal, and no inscription was visible.

Instead of excavating to ascertain in whose honour it had been raised, the Roman antiquarians wrote books to prove, *à priori*, that it was the Columna Navalis, or Naval Column of Duilius, erected in the year of Rome 489, in remembrance of the great victory over the Carthaginians; or that it was a column of the Temple of Jupiter Custos (which stood on the Capitol, and not in the Forum); or that it was a fragment of Caligula's celebrated Bridge!

In 1813, the Duchess of Devonshire had a slight excavation made, and thus brought the inscription to light; when it proved to have been erected by Smaragdus, Exarch of Italy, in A.D. 608, in honour of his master, the Emperor Phocas, one of the basest and most cruel men who ever sat upon a throne.

The name of Phocas has been carefully erased from the inscription, probably by order of his successor Heraclius; but the name of Smaragdus identifies his master, and the date given, of the fifth year after his conversion, fixes the precise time of its erection.

Further excavations show that the pedestal was supported on a pyramid of steps, many of which are still in their places, and raise the bottom of the pedestal about 20 feet above the original level of the Forum.

The height of the pedestal is about 16 palms, or 11 ft. 6 in.; the column, in 8 pieces, is 63 palms, or 46 ft. 4 in. high, and its lower diameter 6 palms, or 4 ft. 3 in.

The inscription tells us, that a gilt statue of Phocas adorned the summit.

The inscription is altogether a curious specimen of servile flattery; and it is strange that no more effectual way of defacing it was adopted, than that of striking out the name of

Phocas, and a few words in different parts. It commences with the Christian symbol of the cross.

+ OPTIMO. CLEMENTIS. felicissimoque.
PRINCIPI. DOMINO. n. Focæ. Imperatori.
PERPETVO. A. DO. CORONATO. TRIVMPHATORI.
SEMPER AVGVSTO.
SMARAGDVS. EX. PRAEPOS. SACRI. PALATII.
AC. PATRICIVS. ET. EXARCHVS. ITALIAE.
DEVOTVS. EIVS. CLEMENTIAE.
PRO. INNVMERABILIBVS. PIETATIS. FIVS.
BENEFICIIS. ET. PRO Qui ETE.
PROCVRATA. ITAL. AC. CONSERVat A. LIBERTATE
HANC. STatuam majestatIS. EIVS
AVRI. SPLENDOre. fulgenTEM. HVIC.
SVBLIMI. COLVmnae. ad. PERENNEM.
IPSIVS. GLORIAM. IMPOSVIT. AC. DEDICAVIT.
DIE. PRIMA. MENSIS AVGVST. INDICT. VND.
P. C. PIETATIS. EIVS. ANNO. QVINTO.

The Pillar is of beautiful workmanship, and evidently of the finest age of Roman taste, *i. e.* of the time of the Antonines.

There can be no doubt that it was taken by Smaragdus from some ancient building, but there is not even a tradition of its original position. It does not now stand perpendicularly, but leans considerably towards the Capitol, and will probably soon fall down.

These three are the only triumphal pillars now standing in Rome. There are, however, two others, not properly triumphal, which deserve to be noticed.

In front of the Church of Sa. Maria Maggiore stands perhaps the finest single pillar in Rome. It is said to have been one of those of the nave of the Basilica of Constantine, and

the only one remaining. It was erected on its present site by Pope Paul V. in 1604.

The shaft, of white marble and a monolith, is 64 palms, or 45 ft. 4 in. in height, not including base or capital, and 8 palms, or 5 ft. 8 in. diameter. On the summit is a bronze Virgin Mary.

At no great distance from this pillar stands another, in front of the Church of St Antonio Abate, of mean appearance and rude workmanship. It is a small pillar of grey granite, set up by Henry IV. in 1595, to commemorate his admission into the Roman Church. In the inscription the well-known motto of Constantine, "In hoc signo vinces," has been adopted. This was regarded as very complimentary to the Roman Church, and expressive of strong confidence for the future, until it was noticed that the part of the column on which the words occur is shaped like a cannon, and thus the inscription may well express a very different meaning.[1]

The use of the solitary pillar as a monument is liable to many objections.

If there be no statue on the summit, the capital and its horizontally projecting termination look wholly out of place; they are evidently intended to support something which is not there.

If there be a statue, then it is necessary to raise it up above the top of the pillar, otherwise the lower part of the statue cannot be visible except at a distance; and for this purpose the form of a large bee-hive is usually adopted, which is neither graceful nor appropriate.

A lofty pillar is not in any way a suitable pedestal for a statue, although this use of it is rather in fashion at the present day. The statue must ever look insecure, and the finest

[1] Spence's anecdotes, quoted by Burton, p. 465.

workmanship of the sculptor is of little value at the height of fifty or a hundred feet above the eye of the spectator.

A statue must be seen within a reasonable distance to produce any pleasing effect; and if raised up on a pillar, how few passers-by will ever cast a glance upon it.

This is amply illustrated in our own capital. How different the effect of Lord Melville's monument, in St Andrew Square, from that of the Duke of Wellington, in front of the Register House, or of those erected on pedestals of moderate height in George Street.

TRIUMPHAL ARCHES IN ROME.

The triumphal arches are an interesting and instructive class of monuments.

Three of them still remain in very tolerable preservation.

ARCH OF TITUS.

(*Plate II.*)

The oldest is that of Titus, erected after his death, with special reference to his capture of Jerusalem.

It consists of a single arch, and the interior of it is richly ornamented by bassi relievi, part of which represent some of the sacred vessels of the temple, brought by Titus to Rome; and from these genuine representations are taken all the figures of them now in circulation.

It stands probably at the highest point of the Via Sacra, and certainly at one of the most striking spots in Rome. On one hand are the ruins of the Imperial Palace; on the other,

Arch of Titus. — After Rossini.

those of the great Temple of Venus and Rome; in front, the Colosseum, and behind lies the Forum.

Connected as it is, by its history and by its sculptures, with one of the most important events which ever occurred, it is an enduring proof of the truth alike of Jewish prophecy and of Christian history. Erected by order of a heathen Senate, it still stands, after the lapse of eighteen centuries, an unanswerable demonstration of the fulfilment of the prophecies regarding the fate of Jerusalem, and the substantial accuracy of the narratives which have been preserved of the awful event.

Neither Jew nor Christian can look upon it without emotion; and it is asserted in Rome, that no Jew will ever pass beneath it.

At this point, the ancient pavement of the Via Sacra still remains; and there can be little doubt that the triumphal procession moved along the valley, betwixt the Palatine and Celian Hills (and here the Arch of Constantine was afterwards placed, probably for this very reason); then from the Caput Viæ Sacræ up a steep slope to the Arch of Titus; then down the Clivus Viæ Sacræ to the Arch of Fabian, now destroyed. By it the procession entered the Forum Romanum; then traversed it to the Arch of Septimius Severus; hence proceeded along the south side of Capitoline Hill, passing the Tabularium and Temple of Concord, and so on to the east side, from which it ascended to the great Temple of Jupiter Capitolinus, where it terminated.

From the nature of the ground, and the distribution of the various buildings, still remaining, this line of march for the triumphs is almost a matter of necessity, and it at once explains the position of the three Triumphal Arches.

The best situation was naturally selected for the oldest of them.

The Arch of Titus has suffered considerably from the effects

of time, and perhaps of violence. It was repaired and restored by Pius VII., much to the indignation of many a zealous antiquary; neither the modern work nor the modern inscription combine harmoniously with the original structure.

In engravings previous to 1820, the Arch is represented as encumbered by masses of buildings of stone or brick, and with several feet of brick-work on the top, probably the remains of a little fortress of the Frangipani in the Middle Ages, when most of the Roman ruins, both large and small, were so employed, by one or other of the turbulent barons.

Now all this is removed, and the Arch stands free; but the whole external part is modern. What is ancient is the archway itself, with its internal sculptures, one pillar on each side of it, the ornaments above the archway, and the cornice and frieze, together with the original inscription fronting the Colosseum. On the opposite side a modern inscription commemorates the recent repairs.

The inscription in honour of Titus is simple and tasteful:—

SENATVS. POPVLVSQVE. ROMANVS.

DIVO. TITO. DIVI. VESPASIANI. F.

VESPASIANO. AVGVSTO.

The pillars are of the composite order, and Winkelman states them to be the oldest example of that order in Rome.

The whole style is rich and florid, though not in excess. The ancient material is white marble throughout, but the modern additions are in Travertine.

Below the inscription is a highly ornamented cornice, and below it a frieze representing part of the triumphal procession, composed principally of oxen led to sacrifice; but, at one end, is the recumbent figure of an old man borne upon a plank or slab, an allegorical representation of the river Jordan, —a customary emblem of a conquered province.

On the keystone, which projects considerably, is a figure of a Roman soldier in tolerable preservation, except the head, which is gone; and, on either side of the keystone, is a beautiful figure of a winged Victory.

The most interesting part of the Arch is to be found in the interior, the sides and vault of which are covered by bassi relievi and ornaments.

The vault is adorned by exquisite *rosettes*, all differing from each other; and in a large compartment in the centre is represented the apotheosis of Titus,—that is, he is shown in the act of being carried up to heaven by an eagle.

On the southern side we see part of the triumphal procession, representing Titus in a triumphal car drawn by four horses, preceded by soldiers wearing laurel crowns, and bearing the Fasces in their hands.

The opposite side contains the celebrated representations of the Temple furniture. Of these, the most distinct are the two trumpets, which cannot be mistaken, and the golden candlestick.

The trumpets are plain narrow tubes, not opening widely at the mouth, and here represented crossing each other.

The candlestick is represented with its seven branches, all of which rise to the same level. Two only of the lamps remain, and the ornaments of the two outside branches are not exactly the same; still the knops, and flowers, and bowls named in Exodus (xxv. 31, 36) may be traced in most of them.

Betwixt the trumpets and the candlestick is a table, doubtless representing the table of shew-bread; and upon it are two vessels, which Reland, who has written a very learned work on these sculptures, considers to be censers.[1]

Three banners appear rising rather above the other relievi;

[1] Relandus de spoliis Templi, 1716.

and on these, we doubt not, were inscribed the names of the various articles, for the information of the spectators.

A few captive Jews fill up the space.

Josephus, the Jewish historian, was present at the triumph of Titus, and has left us various interesting particulars regarding it.

He mentions, besides these articles, the Books of the Law, and the purple veils of the Temple, among the spoils carried in the procession. Of these there is no representation on the Arch.[1]

The ultimate fate of the precious relics is uncertain. Josephus states that the golden vessels and other utensils were deposited by Vespasian in his Temple of Peace, while the veils and the Books of the Law were deposited in the Imperial Palace.[2]

The Temple of Peace was destroyed by fire in the reign of Commodus (about A.D. 190), but the Jewish trophies appear to have been saved; for when Genseric and the Vandals plundered Rome (in A.D. 455), they carried them as part of the plunder to Africa.[3]

When Belisarius subdued the Vandals in A.D. 520, he recovered them, and carried them to Constantinople, according to Procopius.[4]

A Jew is alleged to have warned the Emperor Justinian not to attempt to retain them, because they could not abide in any place but that in which Solomon had placed them, and that the Emperor therefore sent them to Jerusalem; but after this period they seem to have disappeared not only from history, but even from tradition.

The bassi relievi are seen to be greatly damaged when

[1] Josephus' Wars, lib. vii., c. 5.

[2] Jos. ut sup.

[3] Paulus Diaconus, lib. xiii., and Procop. lib. iii.

[4] Lib. ii. c. 9.

closely examined; but standing at the distance of a few feet, they still convey a very tolerable general idea of what they were meant to represent.

Up to the time of Sixtus V., the Arch was buried to such a depth by the accumulation of earth and rubbish, that the sculptures were entirely covered up; and to this, probably, we owe their decay, but perhaps, also, their preservation from total destruction. The representation of the apotheosis of Titus proves it to have been erected after his death, probably about A.D. 82.

SEPTIMIUS SEVERUS.

The next Arch in order of date is that of Septimius Severus, standing at the bottom of the Capitoline Hill, at the south-east corner, and immediately adjoining the Mamertine and Tullian prisons, and the Scalæ Gemonianæ, or Steps of Lamentation, leading up to the Capitol from this side.

It is a building of much greater size and pretension than that of Titus; but altogether produces much less effect, partly from its less correct proportions, and partly also from its now standing in a deep oval trench, from which the accumulated soil has been removed so as to lay bare the whole structure.

It consists of three arches, one large in the middle, and a small on each side, corresponding exactly to the modern requirements of a carriage-way and two foot-paths.

It was built about the year of Rome 958 (A.D. 205), by the Senatus Populusque Romanus, in honour of Septimius Severus, and his sons Caracalla and Geta, on account of their victories over the Parthians, Arabians, and other Oriental nations, as is set forth in the inscriptions, one on

each side, extending over the whole upper part of the building.

IMP. CAES. LVCIO. SEPTIMIO. M. FIL. SEVERO. PIO. PERTINACI. AVG.
PATRI PATRIAE. PARTHICO. ARABICO ET
PARTHICO. ADIABENICO. PONTIFIC. MAXIMO. TRIBVNIC. POTEST. XI. IMP.
XI. COS. III. PROCOS. ET
IMP. CAES. M. AVRELIO. L. FIL. ANTONINO. AVG. PIO. FELICI. TRIBVNIC.
POTEST VI. COS. PROCOS. P. P.
OPTIMIS. FORTISSIMISQVE. PRINCIPIBVS.
OB. REM. PVBLICAM. RESTITVTAM. IMPERIVMQVE. POPVLI ROMANI
PROPAGATVM
INSIGNIBVS. VIRTVTIBVS. EORVM. DOMI. FORISQVE. S. P. Q. R.

It is composed of Pentelic marble. Each front is adorned by four fluted composite pillars and four pilasters, arranged in very close juxtaposition, two at each end, and two in front of the divisions betwixt the large and small arches.

The pedestals of these pairs are covered with bassi relievi; and there are others above each of the small arches, representing, doubtless, important occurrences in the wars of the Emperor and the two Augusti, though it does not appear that they can now be identified with any known facts in history.

The vault of each archway is ornamented by square modillions, containing rosettes; but as the building was erected during the life of Septimius, there was no scope for his apotheosis, as in the case of Titus.

A small side-arch leads from the centre into the two side archways, but the opening is not prolonged through their outer walls, which are built of square blocks of marble; and there is no ornament upon them, nor any trace of such having formerly existed.

On either side of the keystone of the principal arch is a figure of Victory, and on the keystone itself, the remains of a

figure of a soldier, all in close imitation of the same parts in the Arch of Titus. The corresponding parts on the small arches have been ornamented by groupes of figures, two of which, in a half recumbent position, are tolerably entire.

On the top stood originally a groupe of statuary, representing Septimius in a chariot drawn by six horses abreast, with Caracalla on one side, and Geta on the other, and attended by two foot soldiers and two horsemen. This we learn from medals still existing, and such figures would greatly improve the Arch; for one of its obvious defects is want of sufficient height in proportion to its extent in front.

There is a circumstance connected with the inscription which is worthy of notice.

It is plainly seen that the words,

OPTIMIS. FORTISSIMISQVE. PRINCIPIBVS.

as well as the two or three last letters of the preceding line, are much sunk below the general level of the stones.

When Caracalla came to the throne on his father's death, he caused the name of his brother Geta to be effaced from all the public monuments on which it occurred. And no wonder that he did so; for, notwithstanding his pretended grief, and his abundant tears when even his name was mentioned, there is no doubt that he procured him to be foully murdered.[1]

From slight traces and marks, it has been conjectured that the defaced words were—

ET. P. SEPTIMIO. GETÆ NOBILISSIMO. CAESARI. OB.

Piranesi insists that there were bronze medallions on the upper part of it; but it is difficult to imagine where they could be placed.

[1] Spartian, in Caracalla, c. 3, Geta, c. 7.

It is asserted that no cement is used in the structure.[1]

The sculptures are decidedly inferior to those on the Arch of Titus.

A small staircase leads up to the top, from one of the interior arches.

The marble (Pentelic) of which this Arch is composed is of inferior quality; and thus it is now in a less perfect condition than the others.

The ground around it has been excavated more than once; but finally it was brought to its present state by Pius VII. in 1803.

ARCH OF CONSTANTINE.

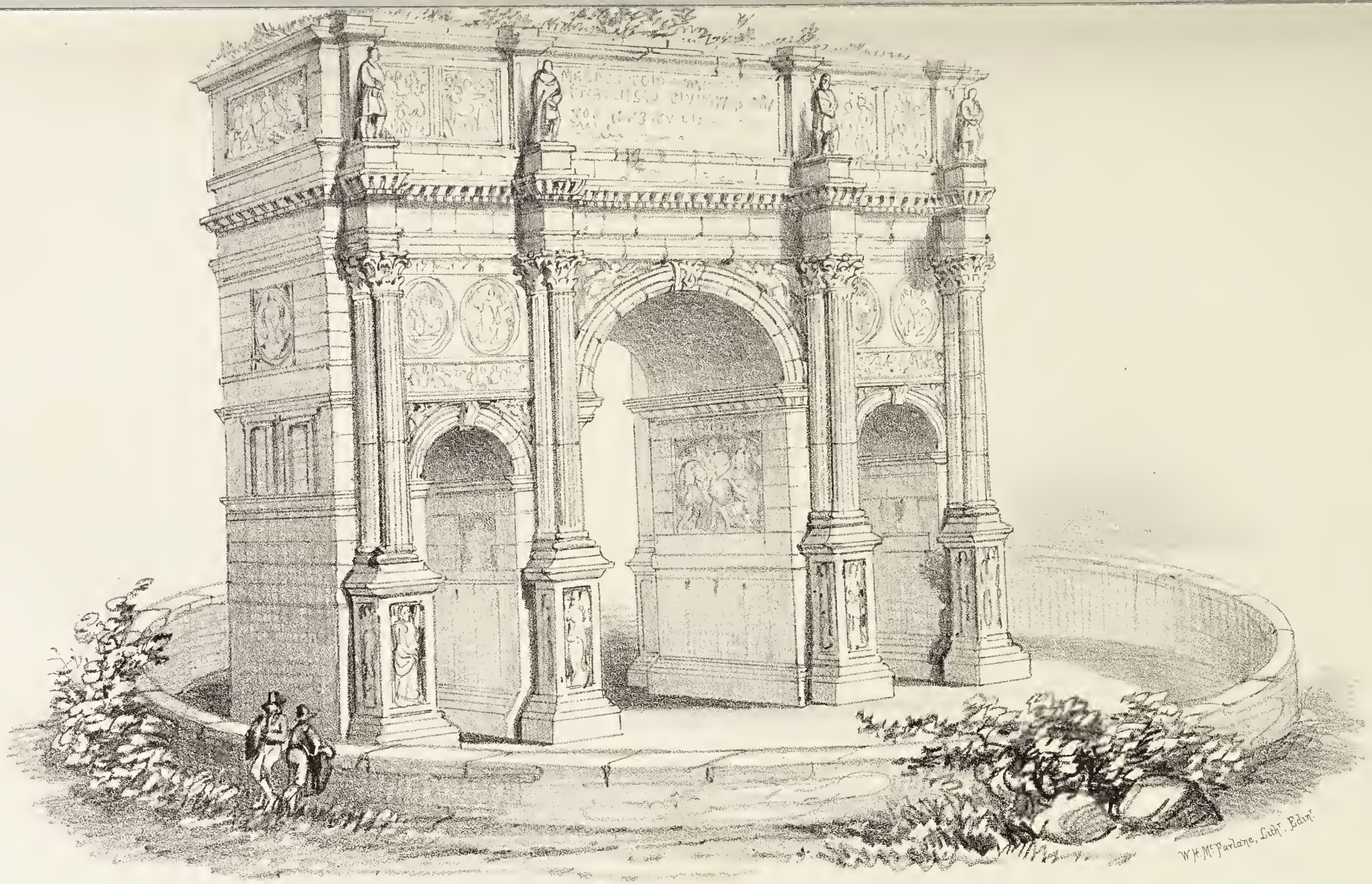
(*Plate III.*)

This is the largest and the best preserved Triumphal Arch in Rome.

It stands below the north-east corner of the Palatine Hill, spanning the road along which, as we have stated, the triumphs passed, and very near the point which we conjecture to have been the commencement of the Sacred Way—the Caput Viæ Sacræ, nearly at right angles to the Arch of Titus, from which it is distant about 200 yards. The situation is admirable, especially looking to it from the west, when it is seen in connection with the Colosseum and the Temple of Venus and Rome.

It consists of one large centre archway and two smaller; the plan being the same with that of Septimius, except that there is no communication betwixt the large and the small arches. The general design is good; the pillars are exquisitely beautiful; and one-half of the bassi relievi and ornaments are

[1] Melchiorri, p. 733.



Arch of Constantine. — After Rossini.

in the best taste, and of the finest workmanship, while the others are so inferior as to be absolutely approaching to Gothic.

A careful examination serves to explain this singular circumstance. The least practised eye detects the difference; and the spectator at once is led to conjecture that the beautiful portions of the work must have been stolen from an older building, while the inferior are of the age of Constantine himself, by which time the arts had greatly decayed. More minute examination discovers that the older and finer relievi represent actions long previous to the era of Constantine, and with which he could have no connection, while the coarser and newer works exhibit well-known passages in his life.

The question next occurs, What do the older ornaments represent? And it appears undeniable that they are actions of Trajan; for the figures of prisoners in Dacian costumes cannot be mistaken.

It is more difficult to say from what particular building they were taken. The common opinion is, that they were procured from the celebrated Arch which led into Trajan's Forum; but it seems hardly possible that this Arch would have been destroyed, or even mutilated for this purpose, at so early a period after its erection, little more than two centuries, when we have every reason to believe that the memory of Trajan was still cherished with peculiar esteem by the Roman populace.

We have, further, the admiration of Constantius, already noticed, when he first saw the Forum of Trajan, which appears scarcely consistent with the idea of one of its greatest ornaments having already ceased to exist; and we have also the testimony of Cassiodorus as to its admirable beauty, more than a hundred years after. It is true that neither Ammianus nor Cassiodorus expressly name the Arch, but their

expressions certainly seem to imply that the whole Forum remained entire.

Admitting that these ornaments pertain to the history of Trajan, there is no necessity for supposing that they were originally placed on a Triumphal Arch. They are equally suitable to almost any other building,—perhaps even better for a hall in the Palace of the Cæsars, or in one of the Basilicæ.

There is a measure of retributive poetic justice in finding that any building in honour of Trajan had been robbed to adorn that of a successor; for he himself was no way scrupulous as to appropriating the works of his predecessors. We are indebted to Amm. Marcellinus for this little morsel of imperial scandal. Speaking of Lampadius, Prefect of the city in A.D. 367, who had made himself notorious by inscribing his own name on the works of others, not as the repairer, but as the builder, he adds: "Trajan the Emperor is said to have had the same fault, whence he was jestingly termed the Wall Weed." Quo vitio laborasse Trajanus dicitur princeps, unde eum herbam parietinam jocando cognominarunt.[1]

A somewhat similar notice is given of Trajan by Aurelius Victor, in his Epitome, where he says that Trajan was called the Wall Weed on account of the many titles inscribed by him on buildings.[2]

There is another theory, that this was originally an arch of Trajan—for he appears to have had several; and that Constantine, or rather the Senate, appropriated the whole building, and removed the lower Trajanic ornaments, and substituted for them those we now see relating to Constantine.[3]

On one front of the Arch are four beautiful fluted Co-

[1] Am. Marcell. xxvii. 3. See also Burton's Antiq. p. 217.

[2] — hic Trajanum *herbam parietariam*, ob titulos multos ædibus inscriptos, appellare solitus erat.—*Aur. Victor*, Epit. Hist. Aug.

[3] See Burgess, Rome, i. 255, 256.

rinthian columns of Giallo Antico, and on the other front, three not surpassed by any in Rome either in material or workmanship; but the effect is injured by the *eighth*, which is of white marble, and inferior work.

Pope Clement VIII., about A.D. 1600, took away the original column in order to serve as a match to another under the organ of the Lateran Church, where it may still be seen. Clement XII., about 1735, erected in its place a similar fluted column, but of white marble, found in Trajan's Forum; and it is now so discoloured by time and exposure, that the difference of material is not very conspicuous at a short distance, and is every year becoming less visible. These pillars are about 30 feet in height.

Above each pillar, in front of the attic, stands a statue representing a Dacian prisoner. Seven of them are ancient, and of the rich, dark-coloured Phrygian marble; the eighth is of white marble, erected at the same time with the pillar which supports it.

There are altogether 18 bassi relievi, 8 above the two small arches, and 10 rectangular on the attic, which represent either general warlike acts, or deeds with which Constantine had nothing to do. Some writers, as Nibby, identify the whole with acts of Trajan; and all of them are of admirable design and execution, especially the eight circular medallions.

The eight figures which adorn the bases of the pillars, and the relievi in the interior of each arch, are of the age of Constantine, and contrast most unfavourably with those above; they are equally rude in design and execution.

The two principal relievi, which represent undoubted acts of Constantine, show the capture of Verona, and the battle at the Ponte Molle, or more properly "ad Saxa rubra," two miles from the bridge, in which he defeated Maxentius and secured the throne to himself.

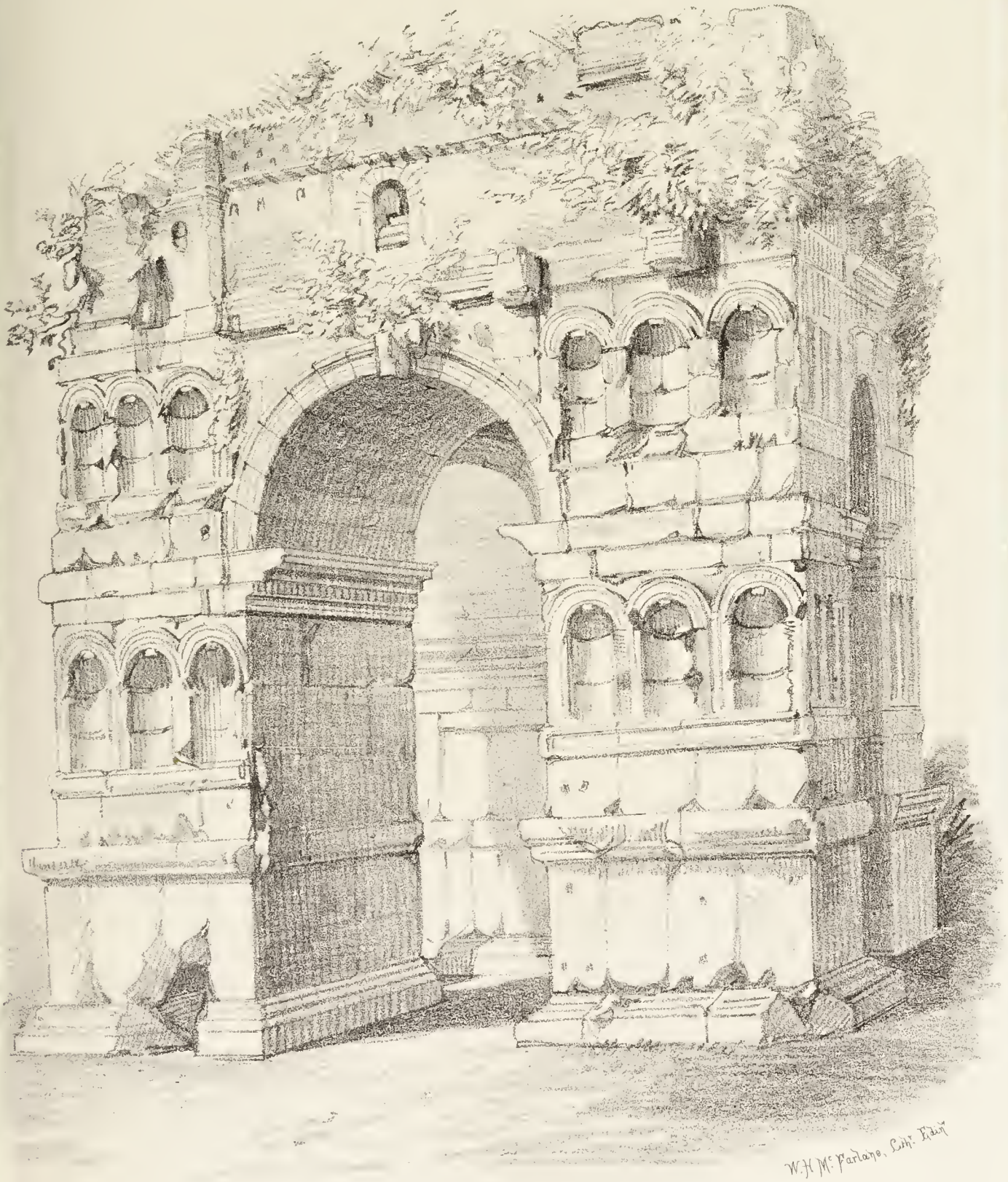
This Arch differs from the two already described, in having the ends ornamented, which greatly improves the effect. The rich cornice below the attic is thus carried round the whole building, and on each end of the attic is one of the fine ancient relievi; while below the cornice is a large medallion, one representing the sun, and the other the moon. Below this is a pair of windows, and a staircase led up to a vault in the attic; on the top was the Emperor in a triumphal car drawn by four horses, as is shown by medals.

The Arch was erected by the Senate to commemorate the well-known victory over Maxentius. The following inscription stands on the attic over the centre arch, and is repeated on both fronts:—

IMP. CÆS. FL. CONSTANTINO. MAXIMO.
P. F. AVGVSTO. S. P. Q. R.
QVOD. INSTINCTV. DIVINITATIS. MENTIS.
MAGNITVDINE. CVM. EXERCITV. SVO.
TAM. DE. TIRANNO. QVAM. DE. OMNI. EIVS.
FACTIONE. VNO. TEMPORE. IVSTIS.
REMPVBLICAM. VLTVS. EST. ARMIS.
ARCVM. TRIVMPHIS. INSIGNEM. DICAVIT.

The peculiar turn of expression in the third line is worthy of notice. It has a decidedly Christian tone in the words "Instinctu Divinitatis," although it gives no decided expression, in unison with what we cannot but regard as the half Christianity of the Emperor himself,—persuaded, probably, in his mind that heathenism was false, but afraid, from political motives, to receive baptism till his expiring hour.

It is suspected that these words, "Instinctu Divinitatis," were not those originally employed, but added after his declaration of Christianity in room of the original "Diis faventibus,"



Arch of Janus Quadrifrons. — After Rossini.

and there is no doubt that the marble of this third line is sunk below the general face of the inscription.

It is remarkable that two of three Triumphal Arches remaining in Rome should be so interesting to us as Christians: that of Titus commemorating the final abolition of the Jewish rites and ceremonies; that of Constantine, the transference of the imperial sceptre from Pagan to Christian hands. We are but too ready to forget the importance of certain events, because, in a mere political or military aspect, they may be less splendid than many others of the same kind. There have been many more bloody and more brilliant victories than that "ad Saxa rubra," and there are many more striking fields of battle than that on which it was fought; the memory of it is not now enshrined, as it well might be, in the hearts and memories of the populace of modern Rome; and yet the result of it has exercised a paramount influence on the history not only of Rome, but of all Western Europe, for the last fifteen hundred years.

The eight statues of the Dacian prisoners on this Arch have long been greatly admired as works of art; and a curious proof of the estimation in which they were held was given in the sixteenth century, when the infamous Lorenzino dei Medici, who soon after murdered his uncle, the Grand Duke Alexander (1537), actually contrived one night to break off and carry all their heads to Florence, where they still are. Clement XII., 160 years after, caused white marble heads to be placed upon them. Now, they are nearly of the same colour with the statues; when first put on, the white heads upon the dark figures must have had a very grotesque effect.

Under the centre vault, on each side, is the effigy of Constantine. One has the inscription, LIBERATORI. VRBIS.; the other, FVNDATORI QVIETIS.

With the exception of the rude sculptures on the lower

part, this Arch deserves the highest admiration both in its plan and its execution; and it is well calculated to serve as a model at the present day.

ARCHES NOT TRIUMPHAL.

These three are the only genuine Triumphal Arches which now remain in Rome, where once they were so numerous.

But there are several other buildings which are popularly known by the name, and which in themselves deserve a brief notice.

The *Arch of Septimius Severus*, in the Forum Boarium, or Velabrum, near the opening into the Cloaca Maxima, is not an arch, but a square gateway erected by the bankers and cattle merchants transacting business in the Forum Boarium, in honour of Septimius Severus, Julia his wife, and Caracalla, as appears from a long inscription of seven lines.

It appears that the name of Geta was effaced from this monument, just as in the Triumphal Arch of S. Severus; for there is a distinct hollow in the fourth line, where it ought to have been. The figure of Geta ought also to occur in various places among the bassi relievi which ornament it; but in every instance it has been rubbed out, and a blank surface left.

The opening is nearly ten feet wide by eighteen high. The whole is of white marble, greatly decayed, and of inferior design and workmanship, clearly indicating the commencement of an age of deteriorated taste.

Still the monument is of considerable value; for the decorations are largely composed of bassi relievi representing sacrifices, and many of the instruments employed in sacrifices; and

from this building a great part of our popular information on these subjects has been derived.

This monument must have been erected before the year A.D. 211, during which Septimius died.

Very near this building is an arch of a very different description, the *Giano Quadrifronte*, or four-sided Janus (*Plate IV.*), on which many different names have been bestowed.

It is one of those Jani which the Romans erected at the intersection of two roads or streets, and is the only example now remaining. The purpose of them appears to have been principally for ornament, but also to serve as a shelter to passengers either from heat or rain.

The building is of white marble, and consists of four massive pilasters, supporting the four external arches and also the centre vault. Each side measures about ninety English feet; and each has twelve niches, in which probably stood as many statues. The building must have stood free from all others, for all the sides are the same; and the effect must have been highly ornamental, and perhaps its convenience compensated for the large encroachment it made on the clear way of the street.

Views of it published previous to 1829 represent a large and picturesque mass of brick-work on the summit,—the remains of a stronghold erected by the turbulent Frangipani, and long held by them as a fortress during the Middle Ages. This was removed in 1828 or 1829, because it was found that water was penetrating through the brick-work so as to injure the Arch.

It does not appear that there were ornaments on the top of the Arch, though no place could be better calculated for a groupe of figures. It is now seen probably as it originally stood, except that no statues remain in the niches. The re-

moval of the mediæval brick-work has greatly impaired the picturesque beauty of the ruin.

Nothing is known of the date of its erection; but its workmanship is good, and apparently of the older empire. The holes pierced in many of the stones are the work of the Middle Ages, to get out the metal bolts employed in fastening the stones together.

The *Arch of Gallienus on the Esquiline Hill* (*Plate V.*)—Our acute countryman, Forsyth, seems to have been the first to point out that this was no Triumphal Arch, but a mere gateway erected by Gallienus, or rather by M. Aurelius Victor, and dedicated by him to Gallienus and his wife, about the year A.D. 260.

It is built of plain blocks of Travertine, and both the design and execution show the decline of architectural taste. The inscription, in two long lines, is a proof, were any wanting, of the little trust to be reposed in the truthfulness of such records:—

GALLIENO. CLEMENTISSIMO. PRINCIPI. CVIVS. INVICTA. VIRTVS. SOLA.
PIETATE SVPERATA. EST.
ET. SALONINAE. SANCTISSIMAE. AVG. M. AVRELIVS. VICTOR DEDICATISSIMVS. NVMINI. MAIESTATIQVE. FORVM.

From this Arch, from the thirteenth century down to 1828 or 1829, hung pieces of chain and keys, being those of the Porta Salsicchia of the City of Viterbo; a singular memorial of the storming of that city by the Romans. Why they were then removed, I cannot tell; but with them disappeared the most interesting feature of the Arch of Gallienus.

The Arch of Dolabella and Silanus stands on the Celian Hill, near the Church of St Stefano Rotondo. It was erected

Plate V.

Arch of Gallienus. — After Rossini.

Arch of Drusus. — After Rossini.

in the tenth year of our æra, when they were Consuls, as shown by the inscription on the side towards the east:—

P. CORNELIVS. P. F. DOLABELLA. C. IVNIVS. C. F. SILANVS.
FLAMEN. MARTIALIS. COS. EX. S. C. FACIVNDVM.
CVRAVERVNT. IDEMQVE PROBAVERVNT.

It is constructed of Travertine, and of good plain design. It was incorporated by Nero into his aqueduct; and to this we probably owe its preservation. The Travertine arch, mixed up with the beautiful brick-work of Nero, looks rather out of place.

It is doubtful for what purpose this Arch was built; but it is conjectured to have been an entrance into the Campus Martialis, where the Equirian Games were celebrated when the Campus Martius was overflowed by the Tiber, and of which the inscription shows Silanus to have been Flamen.

The *Arch of Drusus* (*Plate VI.*) stands within a few yards of the Porta San Sebastiano, and is rather a puzzling building to the Roman antiquarian. There is no inscription upon it; but from a passage in Suetonius,[1] it is probably correctly named.

The modern road passes under it. The lower part is of Travertine, but the vault and its ornaments are of marble. On the side next the City Gate, two fine columns of Pavonazzetto remain; and, when entire, it must have been a very handsome structure.

Caracalla used it to support a part of his aqueduct for the supply of his baths; and the Specus, as noticed in a former paper, is very conspicuous.

[1] Senatus . . . . Marmoreum arcum cum tropeis via Appia decrevit.—*Vita Claudii*, c. i.

Piranesi regarded it as wholly built by Caracalla as a castellum of his aqueduct, but the general appearance is not favourable to this theory.

It is much to be regretted that the triumphal or monumental arch has been so little employed in our own country.

It is, of course, an expensive erection; but when the nation, or a great party, desire to do honour to a statesman or a warrior, no other erection will be found so appropriate or so ornamental. It affords ample space for inscriptions, friezes, medallions, bassi relievi, in every variety, on which the whole series of the man's actions may be recorded; while, if desired, a groupe of statuary on the summit may represent the culminating point in his career.

This latter, however, is by no means necessary for good effect. If the arch be only well-proportioned, it is a beautiful object from every point of view, whether near at hand or from a distance.

The combination of straight exterior outlines with the interior curves, and the shadows thrown by both, and by the corners and pillars, produce an ever-pleasing and ever-varying effect from every point of view.

How noble the architectural effect would have been, had such an archway as we contemplate, been erected at the entrance of George Street into Charlotte Square, at one end, and St Andrew's Square at the other! The only practical objection arises from the encroachment on the roadway; and this is true in the great but narrow thoroughfares of London, but does not apply to less bustling localities. Temple Bar is an unquestionable nuisance; but this does not arise from the fact of an arch standing there, but from the arch and the street itself being far too narrow for the crowds who have occasion to pass under it.

The marble arch in St James's Park is not well-proportioned, and neither it nor that in Hyde Park is well placed, each being at a *corner;* for which, however, in both cases there is a practical excuse on account of the roadway. From the want of sufficient ornament, they look bare and naked; and yet they are beautiful objects on the whole, and have a good effect. How much would it have been increased had they been covered, like that of Constantine, with appropriate sculptures! The life of Wellington would have furnished as many subjects for the arch opposite to Apsley House as that of any Roman emperor, while those of the British army and navy can furnish appropriate deeds for more arches than we are ever likely to erect; and even the more useful principles of philosophers and philanthropists may thus be permanently commemorated whenever enlightened public taste shall determine so to do.

No. IV.

CONCLUDING ADDRESS.

BY

THE VERY REVEREND E. B. RAMSAY, LL.D., F.R.I.E.

[*Read at a Meeting held in Edinburgh on the* 19*th April* 1859.]

Gentlemen,

The Session of the Architectural Institute of Scotland closes this night; and it has been an usual, or at any rate it has been an occasional practice, to close the Session with a few remarks in the form of a *Concluding* Address, as it has been usual to commence the Session with an *Opening* Address. When our respected Secretary made the proposal to me, in the name of the Council, to present your medals and to terminate your Session, I was disposed at once to decline, on the ground, really, that I was assuming an office for which many other members of the Association were far more competent. I wished to see a professional member in this chair. But, however, I was willing to accede to the wishes of the Council, and to undertake the office, and to do my best.

We ask, in looking back upon the transactions of the past Session, What has been done? Can we point to the late proceedings, and say that *anything* has been done? I must say, I think something has been done, and that the four papers read are interesting and excellent. Considering all things, I say something has been done, and well done. This Association, embodied, for a very important object, the advancement of taste and knowledge in Architecture for Scotland, has certainly not met with the encouragement which the early promoters had expected, and which I do think it might reasonably expect; especially, they have been disappointed in the co-operation of *professional* architects. If, however, many highly honoured names are yet wanting, we must not forget our grateful acknowledgments to those distinguished professional men who *have* joined the Association, and who have shown so much kindness and attention, in their active and efficient interest in its welfare.

In making this brief reference to the past Session, and in declaring it to be closed, and this to be the last meeting of the season, I wish I could contribute something more useful and more available to the Association than mere expressions of my interest and good wishes. It is not easy now to get up a subject connected with Architecture which shall have any claim to novelty, so much has of late years been written upon Architecture. Still there are many truths which, however hackneyed, are not the worse of being often repeated, especially as different minds, in repeating them, may, perhaps, sometimes hold them up in a somewhat new, or at any rate, a *different* light. In no department of science has amateur or non-professional labours been more mingled than in Architecture. The leading historians of Architecture—Winklemann, Cuogari, Lunzi, Milizia, Hope, Ruskin—were all amateurs. But does it not seem a very odd and a very unsuitable thing, that

I should sit here, and, as an amateur who has amused himself with Architecture (and has other things to employ his mind), advise and lecture an audience, of whom many are professional architects—have studied it thoroughly, and have more knowledge of the Art in their little finger than I have in my whole body? It is not, after all, so very absurd and so very incongruous. It is good for professional men and non-professional men to be mixed up together. Their points of view are somewhat different; and the professional man may get hints which may be of use from the amateur, because he *is* an amateur, and sees matters in *another* light,—which may be desirable. In all departments of art there are two classes of people to be considered,—those who have to produce the works, and those who have to look at them and be pleased with them. There are the artists, and there are the public. They ought to understand one another, and to feel for one another, and to consult together. Hints from the public, or from the amateur, who is not hampered by technical rules, and often even ignorant of them, may still be of use to the professional man, who may, perhaps, occasionally depend too much upon the strict laws and principles of his art. It is bad sometimes to be overmuch of a *purist*. An artist may therefore fail in giving that satisfaction which he desires, to the very people whom he wishes most to please. For instance, a first-rate artist is employed by Government to purchase pictures for a national or public collection, where the public have to be gratified. Suppose he purchases a picture, or pictures, which everybody condemns—hard, stiff, uninteresting pictures; no one cares for them; every one condemns them. It won't do to say, "Oh, this is most unreasonable. There is a skill, a science in the colouring, and foreshortening, and perspective, which are quite wonderful. There are feats of skill and ingenuity in those pictures, which few artists have ever attained." It may be

so. According to strict rules of art, the pictures are invaluable. The public don't view the matter in this light. They are not pleased with the pictures; and therefore the object of placing them in the gallery is lost. Or take this: A musician lets his friend hear a piece of music he is to bring before the public—a concerto, an overture, a chorus, or some elaborate composition. His friends tell him it won't do. It has no interest; it is dry, tedious, obscure. The musician appeals to his art: the science is profound; the counterpoint quite rigid; the fugues unexceptionable; the modulations in strict rule. It does not signify; the music does not take; the public won't listen; the piece fails. It may be so in anything. In literature, for example, profound learning, accurate versification, correct composition, may all fail, because there is the *reading public* as well as the approving critic. I remember well hearing the late eminent Lord Jeffrey speaking of poems,—I think, poems by C. Lamb. He said the poetry was excellent; everything correct; no fault could be found in a critical point of view. Excellent poetry, he added, for anything but to *read.* Rather a want and a defect in any poem, as the object of poetry is to be read, and not to be criticised merely. Now the question which, in all deference and humility, I have to propose is, May not there be something of the kind in the productions of the architect,—may he not trust too much to the accuracy of his details, and depend so much upon the technical results of science and high authority; that, after great industry, skill, and scientific acquirement, he shall fail in producing what he really desires, and which from his pains he deserves, viz., pleasing effects for the public eye? It does appear to me that we are getting into better days as to architectural productions. There certainly have been accomplished lately, and there are going on, works of a very superior character to what had immediately preceded

them. And I venture to think, that for past improvement and for future advancement, we must look to this great principle—a principle which should be constantly kept in view where Architecture comes to be a practical concern,—I mean the study of *composition* in Architecture, as well as the study of parts. Without this, the architect may go on learning the portions of the best works—drawing with utmost accuracy, and know every line of classic and ecclesiastical detail; and yet, when he comes to make a design for a building, it may be a mere accumulation of parts, each right in itself, no fault to be detected at each point, and yet the general effect be a failure. There is a want of harmony of parts—a failure in the purity of design *as* design. The materials in the hand of the architect are to be disposed in good proportion, with a graceful distribution of the parts. He has, in one word, to look to his building as a *whole*, and as forming one design. It has often been remarked, how happy is the skill of Palladio in this respect; and thus his buildings have no less fine effect when viewed *obliquely* than when viewed towards the great front. There is an illustration of this remark regarding composition to be drawn from the new churches of London. There is a beautiful small temple edifice called a choragic monument of Lysicrates. In itself, and for its own place, nothing can be more exquisite. But then this little design is stuck up in five or six churches for the bell canopy, or cupola, and without any reference whatever to fitness or harmony with the building, and it has become almost ridiculous. Another illustration may be drawn from a London building. The architect had a large church to erect on a narrow piece of ground; and, consequently, it was a long building, and plain, as economy of funds was needful. The church was built accordingly, and the extra funds were laid out upon a very elaborate Corinthian portico. A gentleman, lately from a tour, was contemplating the edifice, along with his servant, who had accom-

panied him whilst visiting the classic shores of Greece, and its numerous architectural ruins and remains. He asked the servant his opinion, to see the effect upon his untutored mind. —" Why, sir, it seems to me as if they had stuck a barrack upon one of them 'ere temples." It spoke strongly for the unsuitableness of the juxtaposition. What I wish now to offer is a remark, not upon what is false, or erroneous, or barbarous in an architectural proportion or outline,—what I mean is, a wrong relative position of things *in themselves* right and beautiful. It affects the adjustment and harmony of parts in their collective capacity, and not their correctness in detail. I think a frequent example of this want of harmony is often exhibited in church towers in England. There are many places where the tower is good and the spire is good, but there is no proper connecting link. The spire was added at a later period; and instead of being built in, is *stuck on.* There are instances of the contrary, where the spire rises gracefully and naturally *out of* the tower, and forms, as it were, a natural continuation. In others, they don't coalesce. The most familiar illustration, however, of this subject, and the most conclusive proof of its importance, are to be derived from the well-known Cathedral of Milan. This is the largest of all mediæval cathedrals. Its width with double aisles must be magnificent. It is the richest in *material,* being (what seems incredible to us here) constructed of white marble—a cathedral of the substance we restrict to our busts, our chimney-pieces, and our tombs. In decoration it is gorgeous; the whole exterior covered with tracery, and enriched with pinnacles, and spires, and crockets, and finials, which from the top present the appearance (as I am told, for I never saw it) of a perfect forest of architectural splendour. In fact, it is unrivalled in Europe. It was planned, and, so far as the upper portions are concerned, has been *built,* wholly according to one design. The great western façade was, however, left un-

finished by the original architects. It was commenced 1385, consecrated 1418, and finally Brumelleschi completed the spire 1440. But the western façade was still left unfinished; and, as time advanced, and bad days for Architecture were coming on, this western façade must be completed. Pelligini was to complete it, and his proposed model still exists. It was so wrong that it is fortunate it was never done. The façade, as we now see it, was finished under Napoleon, of designs from Amati. But it seems strange that the architect, who was a celebrated man, should not have been conscious of the want of harmony of his façade with the rest of the building. His Italian doorways, and windows, and mouldings are utterly incongruous. They may be, and I doubt not are, in themselves excellent, but in their present collocation are all but painful and monstrous. Mediæval forms standing over Palladian or Cinque Cento details, produce a permanently incongruous effect on the mind of the observer of this otherwise noble pile. There have been four architectural qualifications, or four great principles, which have been laid down as belonging to grandeur and beauty in buildings. These are, utility, simplicity, variety, and richness or ornament. I should be disposed to add a fifth, and that is congruity. By congruity I mean, 1*st*, fitness or suitableness in itself, *i.e.*, a suitableness of the parts to one another as a whole; and, 2*d*, also fitness or suitableness of the place or locality in which it is set down. Both are important elements belonging to the department of composition or general effect. Congruity seems necessary to govern the other qualifications,—*e.g.*, variety may be purchased at the expense of congruity, by mixing together parts which, separate, are good, but which, in unison, are quite barbarous, as in a degree at Milan. It should always be remembered how much of interest and charm arises in buildings, as well as in other works of art, from the associations connected with them. Lord Jeffrey's celebrated article in the *Edinburgh*

Review, upon the sense of beauty as connected with association, may be familiar to many whom I address, and is a masterly exposition of the subject. Jeffrey in the *Review*, and Alison in the work reviewed, only just touch on Architecture. But from the general principles it is plain, that if in buildings you destroy the association, much of the beauty is gone ;—a building, therefore, full of interest in one place, may lose much, if not all, of that beauty in another. In a country parish we find a fine Norman church : the short, thick piers, the circular arches, the cheveron ornament ; and, indeed, the whole edifice, and all its parts and proportions, are full of materials for reflection. The thoughts of old times hang around it, and we look upon the building, and all its bold architectural features, with solemn thought, almost with reverence. But all this is lost when the same style of Architecture is used for a church in a modern *street*. We not only have no associations with it of antiquity, but our associations are disturbed,—at least some people's must be. We know from its position it *cannot* be old. Don't mistake me. I am far from saying the adoption of Norman for a street church is absolutely wrong, or is barbarous,—there are many of its details which rank very nicely in themselves. But what I mean is, you lose the peculiar charm of the style, *i.e.*, all its associations ; and, were I an architect, for that reason I would not use it, except insulated, and in such a situation as it *might* have occurred in. Whatever may be thought of this remark, I am quite sure of one thing, it is a fearful incongruity to make, what I have often seen in England, *i.e.*, Norman imitated in *plaster*. The great features of the style are solid, heavy, massive masonry,—great stones cut and carved with labour and pains. But to have all this in stucco—brick below, plaster and paint outside—the separate stones marked by lines drawn with rulers in the wet paste, may give an outline and form to the eye which is pure Norman, but still, it is a sad and mournful playing at Norman Architec-

ture. Then, when the stucco becomes cracked or broken at some angle or corner, the wretchedness of the material is made manifest, and the whole thing exhibited as a sham. The worst cases of stucco Architecture, however, are the restoration of the west front of Litchfield and great centre tower of Durham. But they are about to be indignantly removed. In our country of Scotland, where stone is so fine and so abundant, and the masons so superior, we have never had the temptation to deal in stucco. In parts of England where stone could not be used on account of distance and expense, much has been done to supply its place, and oftentimes with good effect enough. I should prefer cultivating *brick* Architecture, which, at any rate, does not involve the incongruity of plaster; and really, as it has been worked in some instances lately, both for public and private edifices, the effect, with some stone additions for mullions, pillaster columns, etc., has been far from contemptible; better, I think, at any rate, than stucco. It has a finished and picturesque effect when well executed.

In regard to congruity as belonging to sites in Architecture, and adapting the place and the building, it seems to me that the great trial for modern architects lies in the demand for so much street building. The style adopted for an isolated single building, and the style for buildings in the continuity of a street, or for public buildings occurring in the midst of crowded houses, are in many respects so different as not only to possess little that is common, but to have some points of complete difference. In some parts of London, houses have been got up combining the junction of the two principles; *i.e.*, a great number of houses are clustered together so as to form, in combination, a grand design, as if one palace, or great public building. The effect, from some points of view, may be striking enough; but the numerous doors of separate entrance, and other marks of different dwelling-places, seem to me violations of what I have called Architectural Congruity. It is not what

it professes. It is *not* one great building, but many buildings, as separate, for all practical purposes, as if they were all scattered up and down the country. Of course, large buildings with a regular plan are fine things in towns, *i.e.*, provided they *are* independent buildings such as club-houses, theatres, public offices, noblemen's palaces, and so on; nor would it be a violation of my notion of congruity to have a building on a uniform plan in a street, which still seems to be one building, marked by one great entrance, although used for many families or many purposes (as at Naples and other old towns); but the incongruity I speak of is a mere cluster of private houses brought together so as to make a design as if for one edifice. The effect on my mind is something jarring; and it is this and other considerations that make me think it of great consequence to have a good style for street *common houses*, away from, or separate from, the classical or Palladian style,—a style, I mean, which should show the house separate, and yet in combination be ornamental, and rich, and picturesque in character. I have hailed some new work of this kind, in recent buildings of Edinburgh, with much pleasure.

I speak all this with much diffidence, and, in fact, I may have failed even in making myself understood. Still, I hope it might be possible that these remarks on common street house Architecture may lead some one better qualified to take it up at a future time. I am satisfied our fine New Town might have been better, if varied under something of this principle I have so imperfectly enunciated. The architect has before him what we may term two entire and complete elemental architectural forms,—the pure Grecian temple, the elaborate Gothic church. I should call these strictly isolated, and *not* types of continuous architectural effect. Nothing contributes so much to the grandeur and effect of the remains of Pœstum as their standing *alone*. The city gone, and all secular buildings removed. What do we desiderate so much

for the Gothic cathedral as *space?* Salisbury has an immense advantage from its locality.

The *adaptation* of these types according to the different forms which they have assumed, or which have risen out of them, is a great portion of the professional architect's business. There is nothing in the history of the art more interesting than the pure, exquisite, and elegant Grecian Architecture—so simple in its object too—a mere shrine expanding, by the addition of the arch and the raising of columns above the level of the ground, and by other devices, into the elaborate Roman works of triumphal arches, theatres, basilicæ, palaces, hippodromes, viaducts, and other works which modern wealth and manners called for; much of the beauty and character of the first type preserved amidst the expansiveness of the new style. In this field none laboured with more success and more merit than Palladio. Indeed, the style has been called Palladian more for his skill in its use and *extension* than in being amongst the first inventors. He was a great man, and a complete edition of his works (of which, I believe, a good one was published in London) would be a valuable addition to our small architectural library. In conception or composition he is varied and beautiful,—in fertility of invention, in short, in all the higher qualities of the real architect, he stands pre-eminent. In recommending the study of his works, of course, it will not be supposed that he is recommended as if we considered him without faults. He has faults. But his works illustrate the principle which I would enforce, and that is, to make no servile study of any master, so as to disjoin and rearrange his designs, or to borrow his detail and merely tack them together. It would be good to make a fair *imitation* of his works, not a copy; to follow his expression, to compose and to invent, not new ornaments, but new general effects. There is, to my mind, a great difference between a church in the country, or in a large open space in a town, and a church in a street. I did not

hear Dr Alexander's most important paper on Lombard Church Style, a paper which has been so universally admired. But I am rejoiced to think that an example is to be afforded us on so highly respectable a scale of magnitude and ornamentation. The architectural question is, in a national point of view, a great question. The ornaments and the forms of those edifices which are erected for the use and the embellishment of our cities, contribute much to our pleasure, our gratification, our credit, our native honour. Many bad things have been done with British gold; but we have perhaps had enough of complaints against our national buildings in time past. We would now rather rejoice in the turn of the tide which has certainly taken place, and we would look forward with better hope and awakened expectation for the future. It is a great satisfaction to think, that as improved architectural taste and skill have become developed, there have come, at the same time, a great demand for new buildings, bridges, public offices, new streets, noblemen's and gentlemen's houses through the land. And not only a great increase of demand for ecclesiastical edifices with the growing wealth and population, and, I may add, growing zeal of the times; but all denominations and communions are vieing with each other in architectural splendour, and in quarters where there lingered a prejudice and almost a principle against its employment, there has arisen a great anxiety about its purity and its beauty. I hope our Scottish architects will profit, not only in the extent of their knowledge and experience, but in their reputation and their well-deserved advancement in their profession. These imperfect remarks, if they show the ignorance of the speaker, they will manifest, I trust, his love and concern for the cause. And they will furnish an example of what is growing widely and deeply throughout society, viz., a general and growing interest, or keen participation in, all that concerns the improvement and advancement of this noble art.

TRANSACTIONS

OF THE

ARCHITECTURAL INSTITUTE OF SCOTLAND.

In Continuation of Selection from its Proceedings.

SESSIONS TENTH AND ELEVENTH.

1859–1861.

VOLUME V. PART IV.

EDINBURGH:
PRINTED BY MURRAY AND GIBB.

MDCCCLXII.

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Transactions of the Architectural Institute of Scotland,
Session 1859–60.

INTRODUCTORY ADDRESS

BY

JOHN STUART BLACKIE, ESQ.,

PROFESSOR OF GREEK IN THE UNIVERSITY OF EDINBURGH.

[*Read at the Annual General Meeting of the Architectural Institute of Scotland, held on the 24th November* 1859.]

THE HONOURABLE LORD JERVISWOODE IN THE CHAIR.

My Lord,

Architecture is a Fine Art only in so far as, in structures originally meant for the purpose of shelter and protection, it succeeds in realizing the additional idea of the beautiful. The philosophy of Architecture, therefore, is the philosophy of taste, or the scientific principles of the beautiful, modified by those qualities, respects, and circumstances which distinguish Architecture as a species of the realized beautiful from all the other Fine Arts. If so, the necessity of starting with a sound theory of beauty will be at once evident; for as no man can define scientifically what a China rose is, as distinguished from any other kind of rose, unless he first know what a rose in general is, as distinguished from a lily, so it is impossible to say on what principles one pile of stone and

lime is superior to another in point of æsthetical effect, unless we know previously how æsthetical effects are produced at all. The want of a scientific theory of æsthetics—for the so-called association theory abdicates all claim to science in its starting-point—led Lord Jeffrey into the most unsatisfactory attempt to explain the beauty of Classical Architecture, excluding altogether the scientific doctrine of symmetry and proportion which in Architecture generally, and especially in Greek structural Art, holds so prominent a place. It was only, indeed, in the comparatively capricious play of fancy and feeling which we see in some kinds of literature, that the ingenious author of the article on Beauty found any large field for the illustration of his sophism. In that region, it was easy for a clever man, especially with an audience altogether unpractised in such discussions, to make the exception appear the rule, and to propound, as the creative cause of beauty, a principle which at best only renders ugliness tolerable. But amid the stern measurements and well-ordered relations of Architecture, his pretty juggle of arbitrary associations could not even give an apparent solution of the simplest problems, and so fell to the ground as a mere theatrical thunderbolt. The first of those elements in the Architectural Art, which materially modify the general principles of beauty, established by æsthetical science, is utility. A piece of music, or a poem (like Ariosto's Orlando), may have no higher object in view than to occupy pleasantly a busy man's fancy, during intervals of leisure. So novels, even where they contain, as in Adam Bede, the profoundest moral principles, are read by the great majority for the sake of mere amusement, and are valued chiefly for their power of producing a pleasant excitement to the fancy. Not so a building. To give shelter and accommodation are the direct and only purposes of raising any architectural pile; ornamentation of any kind is an accessory always dispensable, often impossible. The scope,

therefore, of Architecture as a field for the presentation of the beautiful, is vastly more narrow than that of the other Fine Arts: the consideration of mere utility dominates everywhere; and beauty, always a secondary consideration, is frequently subordinated, not seldom altogether disregarded. The art of building has not, and cannot have, 'a single eye' to the creation of the beautiful; and, from the want of that singleness of purpose, a failure on many occasions to produce a grand effect is only natural. And not only is Architecture clogged above all other arts by this constant regard to mere utility or convenience; but the materials with which it acts, and the mechanical laws to which it is necessarily subject, raise up on every occasion a host of difficulties which damp the enthusiasm and lame the energy of the artist. For this reason, architects, above all other public exhibitors, ought to meet, what I fear they do not always receive, the most charitable judgment of their shortcomings. If they fall short even of a moderate ideal in so many cases, we must consider that their power of invention is constantly fettered by the harsh material with which they may have to deal, by the imperative conveniences which they must subserve, and by the shallow purse from which they have to draw. It is often not the unskilful architect, but the trustees of the chapel, with their paltry conceptions and meddling conceits, who are to blame for some ecclesiastical eyesore, pushed out into publicity in a place where only magnificence and beauty ought to appear. In the same way, a stunted steeple or a dwarfed tower are, in nine cases out of ten, produced by the humble means of the projector rather than by the want of lofty ambition in the builder. Another consideration of a most important nature, which materially influences the building art, is stability and permanency. It is an easy thing to blow a soap-bubble, or to pile a card castle; and, in some happy humours, to write a good song may not be more difficult. But

to wedge large stones together is always a difficult task; and, when once locked together, it is their nature to stand so long as they are not by violence or unskilfulness removed from the influence of that law of gravitation which is the supreme lord of all material structures. Stability and permanency are, therefore, of the very essence of the constructive art; and stone is naturally the best material for this art, just because men do not raise laborious and expensive structures to-day that they may fall down to-morrow. Of all faults in the art of building, weakness and feebleness is the worst; and the strength that is naturally demanded for any laborious erection ought not merely to exist wherever a great architectural effect is to be produced, but it ought also to appear. A thing must not only be, but seem to be, if it is to make an impression on a passing observer; while, on the other hand, mere seeming is not enough for the more attentive inspector. So far, unquestionably, Ruskin is quite right, and his 'Lamp of Truth' cannot be dispensed with. 'A lie,' says Plato, 'is naturally hateful both to gods and men;' and imitation granite, for example, in a building intended to express massive strength, is a shallow trick, which the inherent veracity of human nature will justly reject with indignation. This principle, however, must not be extended so far as to exclude all painting or surface decoration in cases where there is no intention to produce the effect of mass and strength. In many small English towns—Beverley, for example—the outsides of the houses are all painted, the effect of which is extremely gay and pleasant, and no doubt vastly superior to anything which the native brick of the district, if left to itself, would have produced. In reference to this same point of stability, it is not to be doubted, that, by exciting the idea of eternity, one of the most overwhelming which the human mind can deal with, it becomes a powerful element of the sublime in Architecture. To this the Cyclopean walls in

Greece and Italy, the Druidical circles in this country, the topes of the Buddhists, the Greek Doric temples, and our old Norman churches (as the cathedral of Durham), bear ample witness. This is one excellence, which it seems impossible for the Gothic style to attain in an equal degree. On the contrary, some of the most notable Gothic temples in Europe, so far from producing the impression of stability, show an inherent frailty to the most superficial eye, by the manner in which the supports are applied. 'The choir at Beauvais,' says Ferguson, 'looks so frail, requires so many props to keep it up, and is so evidently an overstrained exercise of mechanical cleverness, that, though it may excite wonder as an architectural *tour de force*, it never can satisfy the mind of the true artist.' It may be further remarked, that the very lines in which Gothic Architecture delights, and the forms which it favours, are not such as can enable it to compete with the Architecture of the Parthenon in respect either of real or apparent stability. The impression of mass and weight is, doubtless, diminished also by the excess of minute and rich ornamentation in which the Gothic style often indulges; for all ornament destroys, to a certain extent, the impression of stability belonging to a plain style, by withdrawing the attention from the large stony masses to the curious whirls, freaks, and flosculosities with which they are overwrought. So in Nature, a granite rock, richly overgrown by flowers of various beauty, may indeed be known, but is no longer seen and felt to be so strong as the sheer bare rock wall without any vegetable decoration. Another element of the utmost consequence in the production of the highest architectural effects, is magnitude. To the other arts size is often a matter of no consequence; nay, great magnitude is very often a powerful cause in weakening their effect. The huge pictures of Tintoretto, for instance, sprawling over the whole wall of an old ducal chamber of audience, or a church, are not nearly

so enjoyable as some of the smallest works of a Teniers or a Hobbima. So in Poetry, Aristotle's maxim holds good, that a good poem should be capable of easy survey by the mind's eye; against which maxim Spenser's great work and the Orlando of Ariosto notoriously offend. But though a building may be relatively too large for its situation or its purpose (which is a matter of congruity), it can seldom be too large absolutely: for, in the first place, the expense of raising a large building is generally so great as to render an error in this direction exceedingly difficult of perpetration; and, in the next place, if only the edifice stands in an open and commanding situation, the greater its magnitude, the greater must be the impression of power which it produces. Of this we have an admirable example in Donaldson's Hospital, in this city—a building which, besides its size, has the additional excellences of being perfectly congruous through all its parts, and of being light without flimsiness. This, indeed, is exactly on the same principle that a huge mountain produces a more sublime effect than a mere hill, however picturesque its outline. Of the effect of mere magnitude the Theban temples are notable examples; and, nearer home, the enormous piles of houses in the High Street produce a sublime effect by this element alone, as they are mostly quite destitute of every other element of attractiveness. The taste of the great building at the bottom of the Mound, in Princes Street, immediately east of the New Club, is liable to serious objection in many points of view. But its magnitude, both in itself and in relation to the noble street where it stands, more than redeems the faults of its ornamentation. Further, magnitude, like stability, should be not only real, but apparent. Against this maxim the gigantic Christian temple of St Peter's, as is generally felt, grossly offends; while, on the other hand, the heathen Pantheon, though its diameter does not exceed that of the cupola of St Peter's, appears comparatively large.

The study of the curious principles on which this difference between apparent and real magnitude depends, is of the utmost consequence to the architect, the neglect of it having so often produced the most pitiful disproportion between the outlay of material means and the æsthetical result attained. An important modification of magnitude is elevation. Elevation is magnitude in a perpendicular direction, and receives importance just as breadth, the other element of magnitude, decreases. In producing effects of elevation, therefore, the grand practical principle is, to diminish breadth as far as possible, without producing the feeling of instability. In practice, I am afraid, it is the want of funds, as already hinted, rather than of scientific ideas, which produces so many dumpy towers and stunted spires. A thing ought to be what it pretends to be, thoroughly and completely; and, therefore, it is generally better to have no spire at all than to have one which gives the feeling either of a conception originally paltry, or of a grand scheme baulked in the execution. On the element of elevation depends great part of the effect of the Gothic as contrasted with the Grecian style of Architecture. The Romans, by introducing the arch and the dome, had the merit of showing the way to that magnificent presentment of gracefully-elevated structure which has immortalized the ecclesiastical architects of the Middle Ages. The change of the round into the pointed arch at once furnished the hint on which the element of elevation in stone structures could be worked up to a combined climax of the beautiful and the sublime; for, with the element of elevation, the feeling of massy and ponderous superincumbence necessarily disappears, while that of airy lightness comes into its place. And, notwithstanding the gross faults of real and apparent instability and weakness already noted in some Gothic temples, it seems doubtful whether, upon the whole, it is in the power of stone and lime to realize a grander conception

than what has been set before us in the most famous specimens of Christian medieval Architecture. We have now to mention a principle which lies at the foundation not only of all beauty in structure, but of the whole creation as distinguished from chaos—viz., order, regularity, and symmetry. This, conceived as—what it is—the necessary product of intellectual action, lies at the bottom of that comprehensive philosophy by the eloquent statement of which, in all its ramifications, Plato, whom Cicero calls 'the god of the philosophers,' has secured to himself the place of a lawgiver in the highest metaphysics, for all times and all places. In all the Fine Arts this principle has an ample and most varied field of exhibition; but it reigns with a peculiar sovereignty in Architecture, though, characteristically enough, it was not even named in the shallow æsthetics of Jeffrey as one of the elements which contribute to the effect produced by this noble Art. The application of this principle, above all others, to Architecture, is dictated by considerations of necessity, convenience, and utility. The very materials which the builder employs suggest the same measured, mathematical relations which Nature, or rather God (for I do not believe in Nature as a power), uses with such chaste beauty in the organization of what we call inert matter into crystals. A certain irregular, rambling, apparently lawless style, may occasionally produce an agreeable effect in works of humour and fancy; but even in poetry the dominion of mere freak is tolerated only exceptionally, while in Architecture the purely fantastic, as a dominating principle of erection, is a positive vice, which can on no account be tolerated. In the definition of architectural terms prefixed to a folio work on Architecture by Isaac Ware, published in 1756–7, I find the Gothic style defined as 'a wild and irregular method of building that took the place of the regular antique method at the time when Architecture, with the other arts, declined.' If this

definition were true, then this style of building would richly deserve all the reprehension with which it was so heavily visited by the one-sided dogmatists of the renaissance. But the fact is, that a Gothic temple is a structure in every respect as regular and symmetrical as the Parthenon; and the domain of mere irregular freak and fancy is confined in the grand specimens of Gothic Art to those minute and subordinate details of decoration, where it performs, with no small benefit to the spectator, the same function that a bright sparkle of wit, or the sharp explosion of a clever pun, does to a learned and grave discourse. That, as a general law, symmetry ought to prevail in all structures, no thinking man, we presume, will deny. But absolute, unqualified symmetry leads unquestionably to monotony, as we see in the streets of Edinburgh, Turin, and Mannheim, Berlin, and the modern parts of Munich. It is necessary, therefore, to provide against this danger, by introducing a certain rich variety, always, however, subject to the grand law of congruity, of which we shall presently speak. The streets of Nuremberg, and the Flemish towns, and some of the old English towns, present happy examples of this combination of unity and variety, by means of which, indeed, the wealth of creative minds, in all the arts, is most triumphantly displayed. It must be further borne in mind, as a modification of the ruling element of symmetry in Architecture, that in erections where weight, mass, and magnitude are secondary considerations, and where the sublime is altogether excluded, a certain fantastic irregularity may be allowed in stone structures with a very pleasing effect. In the cottage style, for instance, in small chapels, and in monuments of a small size, perched on high ground, somewhat of the playful element (as in the light and graceful Choragic monument of Lysicrates) may gracefully be admitted. Amid the grand sweeping lines of landscape, and a rich circumambient breadth of wood, a

regular square building is apt to look formal, and, if confronted with the masses of nature, even petty. The quaint style of our own baronial mansion—witness Craigcrook—will, in such circumstances, possess a charming congruity, not to mention the historical associations of which that style is so suggestive. As an important modification of the general principle of symmetry, we may lay down also, that when a building is very large, a departure from symmetry may be permitted in certain parts, provided there is nothing unsymmetrical in the main part of the building which meets the eye at the first great view. But irregularity can never be tolerated in a building of which regularity is the dominant type, when the irregularity is prominent and forces itself upon the notice of the spectator. A notable example of this is found in St George's Hall, Liverpool—in other respects a magnificent edifice—and in the new Greenock Academy. Very closely allied with symmetry, though not identical with it, is proportion. Proportion in Architecture may be defined the size or number of each of the parts, in reference to the use and significancy of each part, as well as in its relation to the whole. Take the *façade* of a building, for instance, consisting of a middle and two wings. In this case, the laws of proportion plainly demand that the middle division should neither be so small as to be swallowed up by the wings, nor so large as to make the wings appear contemptible. Of this latter defect, the frontage of St John's Chapel towards the Lothian Road affords an example. Again, short, weak pillars on the ground-floor of a massive edifice, are as much out of proportion as a big head on a small body. Or again, a campanile, or church-tower, as an accessory to a church, should not be so large as to dwarf the principal to which it belongs. An instance of this offence against the laws of proportion we have in Dr Caird's church, Glasgow. Another consideration of paramount importance in Architecture, as in

all the arts, is congruity or keeping. But on this head I shall not enlarge, as it does not appear that there is anything special in the art of raising elegant structures which modifies the principle of congruity in any way peculiarly characteristic of this Art, as distinguished from poetry or painting. Congruity, indeed, or subordination of all the parts of a work of Art to the leading conception, is so necessarily the result of the unity of mind, that no production of Art or Nature can satisfy a reasonable being without it. In Architecture, however, it seems peculiarly difficult to be achieved! for offences against it stare us everywhere in the face as we walk through the streets. Those houses in Charlotte Square, of which one part is made of the lightest glass, and the other of heavy pillars supporting nothing, are grossly incongruous. The light, elegant spire of St Andrew's Church, in George Street, is as little in harmony with the heavy body of stone to which it is attached as an archangel would be riding on a beer-barrel. Out of keeping is the dark, dull, gaping frontage of St George's Church, both with the character of the dome and with the very nature of a *façade*, which ought to be cheerful, elegant, and imposing. Inconsistent is the light, bridescake sort of turret on Dr Alexander's church, George IV. Bridge, not only with the style of the building on which it stands, but with the idea of Church Architecture generally. Out of keeping, further, are almost all the houses of Edinburgh which have been recently turned into shops, as it is not in one case out of twenty that any attempt is made to alter the upper part of the building so as to correspond with the changes made in the ground-floor. The last point which requires special attention in Architecture is decoration. In this matter no new scientific principle is involved, other than has been already mentioned; but practical warnings of the utmost importance are constantly called for. An over-decorated style in poetry or painting is, of course, bad, as it

deviates from the simplicity of Nature; but over-decoration or misapplied decoration in Architecture is an unpardonable sin, because it altogether nullifies the natural impression made by the Art. Like the eloquence of Demosthenes, the style of Architecture should always be a direct, massive, business-like style. Stones were not meant to perform antics. Architecture, therefore, as already stated, must be faithful to its grand means of producing effect by the imposing weight of simple masses; and all overlaying with ornament must be regarded as a dangerous seduction and a useless waste of skill. The element of colour, indeed, was used to a considerable extent by the ancients, and in bright climates may often be useful in giving relief to certain parts of the building; but exterior painting would be ridiculous in London or Edinburgh, and remains a doubtful experiment in Berlin and Munich. The real field for coloured ornamentation is unquestionably the interior; and in this regard it is certainly not a little to be lamented, that either indifference to Art, or a silly popular superstition, has prevented any attempt being made to represent subjects of sacred history on the walls of our Scottish churches. The consequence of this stupid neglect has been, that the grand style of Historical Art has almost died out amongst us; and artists of the highest genius have been obliged to sink their powers in administering to the vulgar conceits or the personal vanity of private individuals. That Art can never be the greatest which has to observe no higher congruity than the comforts of a dining-room or the prettinesses of a boudoir.

Transactions of the Architectural Institute of Scotland,
Session 1859-60.

No. II.

A NOTICE OF THE LIFE AND WORKS

OF

WILLIAM HENRY PLAYFAIR,

ARCHITECT.

BY

JOHN MURRAY GRAHAM, ESQ.,

OF MURRAYSHALL.

[*Read at a Meeting of the Institute, on* 16*th February* 1860.]

William Henry Playfair, one of the most distinguished of Scottish architects, was born in London, in the year 1789. His father, James Playfair, was also an architect, practising chiefly in London, and was brother of the celebrated mathematician and natural philosopher, Professor John Playfair, of Edinburgh. His grandfather was the Rev. James Playfair, minister of Benvie, in Forfarshire. William Playfair's father dying young, he came, at the age of fifteen, to Scot-

land, in the year 1804, to reside with his uncle, Professor Playfair.[1]

As a student in the University of Edinburgh, William Playfair attended his uncle's lectures on Natural Philosophy, and no doubt there acquired the rudiments of that scientific knowledge which he afterwards brought to bear on those departments of his profession in which mechanical science and constructive skill were requisite. He likewise attended the metaphysical lectures of Professor Dugald Stewart, though he does not appear to have gone through the regular curriculum of a college education. In the special study of architecture he was the pupil of William Stark, an architect of considerable promise, an excellent draughtsman, and otherwise a master in the technical part of his profession. Stark died in 1813.

His education being thus so far advanced, William Playfair went for a time to London, to perfect his knowledge and improve himself in the methods of his profession. He studied there under the architects Wyatt and Smirke. In the summer of 1816 he made a short visit to France, in the company of his uncle, returning thereafter to Edinburgh. His only other visit to the Continent was in the year 1843, when he went to visit his brother, Dr James Playfair, who was a physician at Florence. The state of his health obliged him to return without visiting Rome.

In the middle and end of the last century, British architects professed still to be following in the footsteps of Inigo Jones and Sir Christopher Wren, building in what was called the Classical or Palladian style. But the spirit which animated the works of these great men was gone, and their successors had refined away the Palladian style, with

[1] Lord John Russell, Charles Brownlow, afterwards Lord Lurgan, and Basil Hall were about this time inmates of Professor Playfair's house and family, having their education superintended by him.

its ordered *façades*, its decorated windows, its rich cornices and balustrades, into an insipid plainness, not much improved by the adoption, to an extent tiresome by repetition, of Grecian porticoes attached in the most indiscriminate manner to the fronts of structures civil and ecclesiastical.

In the beginning of the present century, the influence of the improved study of genuine Greek architecture, which was promoted by the publications of Stuart and Revett, began to be felt; and a desire arose for a style of art more strict than the Italian, and which had reference to the Greek fountain-head of classical architecture. About the same time, it is not unworthy of remark, efforts were made in aid of the revival of the Gothic architecture, particularly in ecclesiastical structures.

The professional predecessors of Playfair more immediately deserving of mention were William Adam, and his sons Robert and James Adam, natives of Scotland. William Adam was the architect of Hopetoun House in West Lothian, and of the Edinburgh Royal Infirmary. Robert and James Adam were extensively employed both in England and Scotland. They built Lord Mansfield's house at Caenwood, Luton House in Bedfordshire, the Adelphi Terrace and Screen of the Admiralty in London, and the Register House of Edinburgh. Robert Adam died in 1792, James died in 1794.

One of the last works in the preparation of designs for which Robert and James Adam had been engaged, was the new building for the University of Edinburgh. Of their designs the only part ultimately adopted was the present street-front of the College, of Roman Doric, and the Ionic colonnades at the angles of the interior court. It was not till the year 1816 that the Parliamentary commissioners appointed for rebuilding the College of Edinburgh took active measures for this purpose. Architects were invited to give

in plans to the commissioners, with their names attached. The designs were exhibited for public inspection in the City clerk's chambers. From the Minute Book of the Parliamentary commissioners (Dec. 4, 1816), it appears that they 'unanimously approved of and resolved to adopt the plans of Mr Playfair,' with certain exceptions and modifications. They awarded to him the first prize of one hundred guineas, and the second, of eighty guineas, to Mr William Burn, architect.

Mr Playfair proceeded to execute the great work entrusted to him, by designing and superintending the building of the quadrangle of Edinburgh College, as we now see it, incorporating in his design the Adams' street-front, and their Ionic arcades in the interior angles.[1] One side of the quadrangle was devoted to the library hall; the design for which weighed greatly with the commissioners in favour of Playfair. The nobleness of the architecture which meets the eye in this hall, is acknowledged by every one. Competent judges have declared the carpentry of the roof to be of most skilful and scientific construction; and a model of it is preserved in the Museum of Natural Philosophy as a specimen of mechanical skill. The hall combines, with wonderful harmony, the qualities of vastness of space, proportion of parts, and adaptation to its purpose as a library. Without entering into minute criticism, the College of Edinburgh may take its place as a fine example of the Italian style of architecture; its effect, however, being somewhat marred by the site on which it is built.

Playfair was next engaged (1818) with designs for the Astronomical Observatory on the Calton Hill, and for Dollar Academy. Both of these are in what he termed the Roman style. The Observatory consists of a small central building,

[1] Robert and James Adam had proposed a dome, of no great dimensions, to surmount the entrance front. Playfair gave a design for a larger dome in the same position, which was relinquished on the ground of expense.

surmounted by a cupola, having on its four sides four similar hexastyle porticoes of Roman Doric. Its defect seems to be a want of mass and breadth in the body of the building, so as to admit of the four porticoes having their requisite effect as such. There is a total absence of ornament and sculptural decoration on the pediments and frieze.

In 1819, he gave designs for the gateway-house or lodge of Heriot's Hospital, and for the Advocates' Library. Of the first it is sufficient to say, that it is in admirable keeping with the noble structure to which it forms an adjunct. The ornamental detail is rich and carefully applied. The design for the Advocates' Library proposed an extensive quadrangle, having an elaborate front of Corinthian columns, with porticoes at each end, towards George IV. Bridge. This design was never carried into execution. The portion of the library, subsequently built from Playfair's plans, consists of a spacious long room or gallery, intended to connect the outer Parliament House with the proposed quadrangle.

In 1820 and following years, he was engaged with extensive designs (which were, after competition, approved of by the Magistrates of Edinburgh and the other proprietors) for a series of terraces, crescents and streets, on the Calton Hill and north-east of it. The most remarkable of them are the Regent, Royal, and Carlton Terraces, on the Calton Hill. He designed also Brunswick Street, Leopold Place, Hillside Crescent, Windsor Street, and, on the north side of Edinburgh, the Royal Circus.

Playfair's street architecture was a great improvement on the first great lines of streets and 'divisions' in the New Town of Edinburgh. In the street storey of the Royal Terrace, arched doors and windows are adopted. In the other streets, the horizontal lines of Greek architecture in the architraves of doors, windows, etc., are observed. All of these streets have cornices; some have balustrades surmounting the

cornice. The Royal Terrace has both cornice and frieze, and occasionally an attic above. So far as I have observed, the small pediments, so frequently seen over windows and elsewhere, are not introduced in any of these streets. The frontage of the Calton Hill terraces, giving all the fine points of view of Arthur Seat, Firth of Forth, etc., is deservedly admired.

His reputation as an architect being now well established, Playfair was, in 1822, appointed by the Board of Trustees for Scottish Manufactures to prepare designs for the Royal Institution on the Mound, Edinburgh. This building, which was at first about half the size it now is, was subsequently lengthened towards the north, and much improved. It is on the general plan of an octostyle peristylar temple of Grecian Doric. The principal front, towards Princes Street, consists of a portico with double row of columns; a statue of the Queen, by Steele, being placed on a raised plinth immediately above the portico. The necessary departure from the simple parallelogram, caused by the requirements of the design, is compensated by the introduction of four small porticoes, of two columns respectively, at each end of the side ranges of columns. There are nineteen columns on each side, and an octostyle portico, of a single row of columns, fronts the north; thus giving an entire peristyle of fifty-four columns. The building stands on a stylobate of four steps. The interior consists of a large central gallery for exhibitions, with suites of rooms on either side, and a gallery above for sculpture and casts.

Although the plan and detail of the Royal Institution are in many respects admirable, yet, on the whole, it is deficient in effect, and that mainly on account of its position. A structure on the plan of a Grecian temple should be elevated on a height, as almost all the best ancient examples of temples are. The want of this condition is the more felt in the present instance, where the ground rises on either side, and

the neighbouring buildings are so high; while the unclassical arrangements for conveying away smoke, necessitated by our northern climate, are very imperfectly concealed by the screen of the parapet which surmounts the building.

In 1826, Playfair was engaged, along with Mr Cockerell, with designs for the National Monument on the Calton Hill, proposed to be built on the plan of the Parthenon. Twelve fine columns, and part of the entablature, with the stylobate and substructure, attest the care and taste with which he superintended the execution of this undertaking, so far as it went. In this year he also furnished the design for St Stephen's Church, Edinburgh, which, placed, no doubt, in a difficult situation, is not usually regarded as one of his happiest efforts. The carpentry of the roof is admired. This church is in the Italian style; and had the spire been simpler toward the summit, and more of an Italian campanile, such as is common in the middle-sized churches of the north of Italy, the effect might perhaps have been improved.

Playfair is considered to have been very successful in his application of the Italian style of domestic architecture to country mansions, granges, etc. In this style he built, in 1827 and subsequent years, Mr Cumming Bruce's house of Dumphail, in Morayshire; Colonel Close's house of Drumbanagher, in the county of Armagh; and the late Lord Mackenzie's villa of Belmont, near Edinburgh.

The Surgeons' Hall, Edinburgh (1829), is considered one of Playfair's best works in the stricter classical style. Without being a copy of any ancient example, the front elevation of Ionic columns is imbued with the feeling of genuine Greek architecture. It is not, like many so-called Grecian buildings, defective in sculpture ornamentation. Its general proportions are excellent, though exception may perhaps be taken to the size of the main door of the building, as compared with the portico within which it stands.

Passing from the Greek to the Scottish baronial style, we find Playfair engaged upon designs (1831–1836) for various houses in the latter style, chiefly, however, additions and alterations. Such were Prestongrange, in East Lothian; Grange House, Craigcrook, and Bonalie, near Edinburgh; and Barmore on Loch Fine, a new house. He also (1841) gave a design for Islay House, in the island of Islay, in the same style; but of this the offices only were built.

This variety of domestic architecture, which followed upon the massive and plainly built castle or keep of an earlier period, dates in Scotland from about the beginning of the 17th century. It is distinguished by lofty crow-stepped gables, by one or more towers engaged in the main building, by angle turrets, usually round and conically covered, supposed to be borrowed from the French chateau architecture, and generally by a picturesque variety of outline. Playfair, rightly holding this mode of building to be distinct from the Elizabethan architecture of the same period in England, carefully preserved in it the characteristic Scottish features, while adapting the internal arrangements of the houses to the conveniences of modern life. It is believed that previously the Scottish baronial style had been very little, if at all, cultivated as a style for modern houses.

Two monuments by Playfair, erected on the Calton Hill, deserve special notice. That to Dugald Stewart (1831) is effective and beautiful. With the Choragic monument of Lysicrates in view, the architect has varied considerably from this original. The Greek monument is solid in the centre, with six engaged Corinthian columns; the Scottish is open, with eight columns, having a large stone urn in the centre. The roof and cornice of the Stewart Monument is plain, while the upper portion of the Greek is in the richest style of art. The building is well placed on one of

the rocky sides of the Calton Hill. The small monument to Professor Playfair is a good example of Greek architecture. Solid and four-sided, with engaged Doric columns and entablature, it stands upon a pedestal of about its own height.

In 1832, Playfair designed for Lord Lynedoch a villa or farm-house on the banks of the Almond, near Lynedoch, in Perthshire, in the modern style of Italian rural architecture, with a campanile. The bridge of Dalcrue, near this farm, spanning the river Almond with a single arch, was also built from Playfair's plans. The arch is semicircular, 80 feet in width, and rising 40 feet in height from the average water-level.

We have seen Playfair hitherto in his principal works following the Greek and Roman architecture. His talents were now to be applied in a different walk. What has been called the Tudor style arose in England in the 16th century, when upon Mediæval or Gothic architecture in its civil and domestic application were engrafted various modern features. The combinations thence resulting assumed a marked and individual manner, expressive of a high condition of social refinement and grandeur. In the great mansions of the time of Henry the Eighth, from which this style takes its name, gables, turrets, saracenic domes, projecting oriel windows and elaborate chimney-shafts were mixed in a picturesque though somewhat irregular manner. The introduction of Italian ornamental detail was reserved for the time of Elizabeth. It is to be remarked that there is nothing by Playfair in the Elizabethan style except the gateway of Heriot's Hospital.

Lurgan House, in the county of Armagh, Playfair designed in 1833 in the Tudor style. Fleurs, the mansion of the Duke of Roxburgh, he so altered and enlarged in the same style, that it may be considered an original work. He

is said to have himself been more satisfied with Fleurs than with any of his other works.

His latest work in the Tudor style, and which has gained for him the most extensive reputation, is Donaldson's Hospital, erected from a fund of L.200,000, bequeathed by James Donaldson, printer in Edinburgh, for endowing an hospital for the maintenance of poor children. This building, which stands on an elevated piece of ground a mile westward from Edinburgh, was commenced in 1842, and finished in 1850. The length of its south or principal front is 270 feet, and its depth (exclusive of the chapel, which projects 90 feet from the north front) is 260 feet. The size of the quadrangle within is 175 by 163 feet, being greater than the external dimensions of Heriot's Hospital, which is 160 feet square. In the centre of the south front, a tower, 49 feet square, having four octagonal turrets, with a lofty central oriel corbelled above the entrance doorway, rises to the height of 120 feet. The four corners of the building have each a tower, 43 feet square and 92 feet high, with square turrets. Along the main building are attached buttresses appropriately ornamented. The windows are mullioned and labelled. The chapel has arched mullioned and transomed windows, which, with a lintelled oriel, serve to mark the idea of a domestic or baronial chapel. Taken as a whole, this building is of size and dimensions such as to render it impressive. It is of just proportions, and enriched with appropriate detail, and is considered on all hands to be one of the architect's most successful works.

The only buildings of Playfair in the Gothic style are Minto Church, a small country church in the later or perpendicular Gothic, with a western tower; and the Free College, Edinburgh (1846), of which the interior quadrangle is admired as an example of collegiate architecture.

The National Gallery, on the Mound, Edinburgh, was

erected at the joint expense of the Government and the Board of Trustees for Scottish Manufactures, from designs prepared by Playfair in 1850. It is of Greek Ionic, and consists of an oblong building, with a square central mass (divided internally into two galleries lighted from above), having a hexastyle portico in the centre of each side, and two small tetrastyle porticoes, separated by a recessed portico at each of the ends. The stretches of bare wall on either side of the central porticoes, unrelieved by any decoration save very plain pilasters, are what the eye has most difficulty in being reconciled to. There is no sculpture on any of the pediments. The north and south fronts, enriched with their Ionic columns, have a better effect than the east and west sides of the building. The interior galleries are admirably planned for exhibition or picture galleries.

This may be said to close the account of the works of William Henry Playfair. His life, exclusive of his professional engagements, was not an eventful one. He was never married; his sister, Miss Playfair, residing with him in his later life. Some fifteen years previous to his decease, Playfair's constitution, never a robust one, began to be impaired. He suffered latterly under a paralytic affection of the spine, or some cognate complaint. This malady, which he bore with fortitude, enfeebled his body, and for several of his last years caused his withdrawal, in a great measure, from society; but, until the illness which preceded his death, his mental faculties continued unimpaired. He died in his house in Great Stuart Street, Edinburgh, on the 19th of March 1857, at the age of 67.

Mr Playfair was distinguished by the amenity of his disposition, his gentlemanly bearing, his honourable character, and exemplary conduct in all the domestic relations. In religion he was of the Church of England. Of a retiring nature, he at all times rather shunned general society. By his profes-

sional associates he was much esteemed. Among his more intimate friends were Mr Cockerell and Mr Blore, architects, Mr Telford and Mr Jardine, engineers, and some of the leading men of the Whig party in Edinburgh,—a connection no doubt dating from the time of his becoming an inmate of the family of Professor John Playfair.

No one could be more devoted to his profession than Playfair. In making and carrying into execution the designs with which he was entrusted, he spared himself no labour, mental or physical. His taste was fastidious to an almost painful degree, and he would consider a thing for days and weeks before he could satisfy himself. He executed great part of the drawings for the various buildings on which he was engaged with his own hands, often working at them twelve hours in the day. He paid strict attention to details. Although himself very skilful in mechanical construction and carpentry, he advised much in matters of this description with practical men. Both in this department and in details of masonry, he had a power beyond most architects of obtaining the best possible work from the hands of the men who wrought under his direction. In engineering, his chief adviser was Jardine. His most careful advice and diligent labour were at the service of his employers, and he would lay out their money as scrupulously as if it were his own. But he required, on the other hand, from them implicit reliance; and no man, of whatever position in society, could command or retain his services, if by word or deed he showed a hesitating confidence.

That Playfair's talent as an architect was of a high class, I think no one can deny. His great rule in architecture was to study proportion in his buildings, with perfect harmony of manner and detail. He disliked nothing so much as attempts to disguise deficiency in proportion by ornament. To a full and accurate knowledge of the theory and practice

of his profession, he added a delicacy and refinement of taste cultivated to the utmost.

It is no depreciation of Playfair to say that he was an architect of consummate knowledge and taste rather than of genius, when it is considered how rarely the gift of genius is bestowed. In the case of certain of his works it has been said for him, that his comparative want of success was not to be imputed to himself, seeing that his talents were not allowed full scope, either on account of difficulties arising from site, or from necessities of interior accommodation, or, still more, from insufficient funds. It might be a subject of nice speculation with reference to these works, how far the alleged difficulties would or could have been overcome by an architect of greater genius, of bolder and broader views. Playfair kept within the rules of his art, and followed the safer course.

Again, it might be asked, whether he studied sufficiently, or cared for what may be called 'the picturesque' in architecture? Let us test him as to this, by a passage in one of Sir Joshua Reynolds' Discourses,[1] where, referring to the architecture of Vanburgh, he says,—'To speak, then, of Vanburgh in the language of a painter, he had originality of invention, he understood light and shadow, and had great skill in composition. To support his principal objects, he produced his second or third groups, or masses; he perfectly understood in his art what is the most difficult in ours—the conduct of the background; by which the design and invention is set off to the greatest advantage.' The background in painting is, in architecture, the real ground on which the building is erected. Now, as to this particular, I believe that Playfair anxiously studied to have his buildings harmonize with the ground on which they were placed, and with the neighbouring objects. He was perfectly alive to the importance of 'the conduct of the background,' so as a building

[1] Thirteenth Discourse.

should not stand out crudely by itself, but be in congruity with circumjacent features; and I think he has shown his understanding of this whenever he had an opportunity of doing so.

But in regard to the other characteristic features of picturesque architecture, referred to in the passage quoted, it may be questioned if Playfair comes up to the mark of either Vanburgh or (to take a nearer example) the architect of Heriot's Hospital. In light and shadow, in the composition and grouping of its towers and turrets, will Donaldson's Hospital compare with Heriot's? There is a boldness in the outline of Heriot's Hospital, and a skill of composition in the way the groups of lesser towers are made to support the greater, which seems to answer, as nearly as possible, Sir Joshua Reynolds' idea of the picturesque in architecture, and which Donaldson's Hospital, with its studied regularity and careful grouping, hardly attains to.

No better proof can be afforded of the estimation in which Playfair is held, than to test him by high standards. Enough, and more than enough, of merit remains to place him near the front in the race of reputation; for, after all, if the qualities by which his works are especially distinguished, be proportion, symmetry, and keeping, these are the qualities which admittedly constitute the principal element of beauty in architecture.[1]

[1] The author of this paper has to express his obligations to Mr Anderson Hamilton, architect, Edinburgh, for much particular information in regard to the architectural works of Mr Playfair, and their dates. In preparing and carrying out his later works, Mr Hamilton was professionally associated with Mr Playfair. This Notice, when read in the Architectural Institute, was illustrated by Mr Playfair's admirable drawings, for the principal buildings, kindly lent by his trustees for this purpose, and now deposited (or about to be so) in the Library of the College of Edinburgh.

The following is a Classified List, according to their Styles of Architecture, of the principal works of Mr Playfair :—

1. *In the Greek Style.*

Royal Institution,
Surgeons' Hall,
Dugald Stewart's Monument,
Professor Playfair's Monument,
National Gallery,
} Edinburgh.

2. *In the Roman Style.*

Edinburgh College.
Dollar Academy.
Calton Hill Observatory.
Royal Terrace, etc., Edinburgh.

3. *In the modern Italian Style.*

Drumbanagher House, County Armagh.
Dumphail, Morayshire.
Belmont, near Edinburgh.
St Stephen's Church, Edinburgh.
Dalcrue Farm, Perthshire.

4. *In the Gothic Style.*

New College, Edinburgh.
Minto Church, Roxburghshire.

5. *In the Tudor Style.*

Fleurs, Roxburghshire.
Lurgan House, County Armagh.
Donaldson's Hospital, near Edinburgh.

6. *In the Scottish Baronial Style.*

Grange House,
Prestongrange,
Bonalie,
Craigcrook,
} near Edinburgh.
Barmore, Loch Fine.
Islay Offices.

Transactions of the Architectural Institute of Scotland,
Session 1859–60.

INTRODUCTORY ADDRESS

BY

COSMO INNES, ESQ.,

PROFESSOR OF HISTORY IN THE UNIVERSITY OF EDINBURGH.

[*Read at the Annual General Meeting of the Institute, held on* 21*st December* 1860.]

Although I feel that some apology is due to you for my appearance before you to-night, and some explanation even due to my own character for modesty and sense, when I presume to speak about Architecture—being ignorant of the first principles of the Art, and even of its technical terms—I believe I shall consult your wishes and convenience best, by leaving out my reasons and excuses and defence, and whole preface in short, and passing at once to the matter I have in hand.

On coming out from my place of daily durance, by the well-known footpath which leads from the corner of the Parliament Close to the Lawnmarket, my eye is greeted with a curious medley of Architecture. On my right hand is old St Giles', a pattern of ignorant renovation. On my left is the unsightly portico of the County Buildings, of which the best that can be hoped is, that it may soon vacate that fine situation. In front is the Lawnmarket and the upper divi-

sion of the High Street. I see it generally with a western sun, and I suppose no such line of street is to be found anywhere else; at least I have been looking over Europe for some years, and I have seen nothing so noble in position, in spaciousness, in imposing height, in worthy terminations, as the whole street which connects Edinburgh Castle with Holyrood. And then how full of historical and most picturesque associations! Strangers—foreigners—feel the effect of these. I hear them inquiring of the cicerone of our quarter,—'Was this, what you call Parliament House, really the house where the Parliaments of old Scotland met? and did King, Lords, and Commons all sit together?' Or,—'In which part of the street did Argyll stand to see Montrose pass to execution?' Or,—'Where did Porteous fire on the people, and where was he hanged?' And if strangers feel the influence of these associations, how is it with us Scotchmen? I believe there is no feeling more general among Scotchmen—few even stronger—than the love we bear to our old city, and the pride we take in it, through all its troubles and degradations. But these are not small. Step with me, if you please, back to that corner of exit from the Parliament Close, and look right across the street. I don't know of what date these houses are; late in last century, I suppose, that dreary time of heartless, unfeeling masonry, for we cannot call it Architecture. But the neighbouring houses, and, I presume, the right of some proprietor to a stance or room half-way to the clouds, had forced the builder to give massive walls at least, and lofty. The windows are mere square holes cut in the black wall. But you will observe, he had, for want of any other plan, thought of topping his front wall with four small gables to the street. That was his plan, but his heart failed him, or his ladders were too short; for, you see, the gables are bevelled off and smugged into four slated roofs, dripping to the pavement!

I know a similar case in the country. It is a castle on Speyside—a fine situation, and a good massive pile. The staircase to the south is a cork-screw, and, outwardly at least, is a good feature to the front, a small round tower breaking the square *façade*. It isn't very old—about 1600, perhaps—and the little stair-tower had ended appropriately in a conical top, a pretty enough breaking of the sky-line. But the conical top was apt to lose a slate in windy weather, and slaters were not plenty nor very venturesome in Strathspey; so the laird beheaded his tower somewhere in the end of last century, and sloped the roof equally over house and tower, from the ridge-stone to the drip. I need not say the effect is mean enough; but we are used to such things in this country. Last century was the poor age in Scotland. We were poor of money, of taste, of dignity, and feeling. The houses that our forefathers built and appreciated in the two centuries preceding—the fine castles of Aberdeenshire, the stately burghal dwellings of our cities and towns—were neglected, allowed to fall to decay, often removed to make way for the square box, with a chimney at each end, a door and five holes called windows, which served us to dwell in.

Now, a better feeling has returned—fortunately, also, with more means (do not the two things go together rather more than we are willing to allow?); and our question now is, how the house can be built best—not precisely,—'How can I stow away my family for least money?' This plenty of money gives rise to an opposite fault, and our present condition puts one in mind of an old print, which represents an Englishman, purse-proud and whimsical, standing, with shears in hand, meditating on the cut of his garment, determined to have something 'stunning' new. I think there are verses under the figure, like this—

> 'I am an Englishman, and———I stand here,
> Thinking and devising what raiment I shall wear.'

We are in a free country, and every man may build his house as his taste and his purse dictate; and so best, certainly. It has long ago been said that no uniform plan of a town, or even of a great street, however admirable, can be so successful as when each house is set down after the owner's whim. Like other sayings, it is half true. I don't want an imperial architect to pull down and build up at his own irresponsible *fiat*. I would not give up the historical associations of old Paris. I would not sacrifice even the quaint houses, narrow twisting streets, slightly inconvenient though they were (very convenient for barricades), for the dull, straight, handsomeness of the arcades of the Rue Rivoli.

But yet the license is not without *some* law. Remember what Horace says, in some well-known lines about painters and poets, where I shall take the liberty of including the kindred artists of Architecture, and offer a rough translation—

> 'To painters, poets, architects, is given
> A right to dare, free as the winds of heaven.'

Admitted, says our author—dare as you please—use any freedom you please, with this only condition, that you do not shock Nature and man's eye by combining things incongruous, by mixing different styles. All the poet's rules, even all his quaint examples, are more applicable to Architecture than to either of the kindred Arts.

Is there any style appropriate to each situation? Limit our answer with modifications, and exceptions, and reservations, as carefully as we please, still we must answer, *Yes!* I don't mean only to fix what is suitable for the nature of the ground—for a plain or an acropolis—for the Calton Hill or Ireland's Yard. I think we can go further. As we are now agreed that each country has a peculiar style of Architecture—as we could tell the 'Elizabethan mansion' of

the late eloquent Mr George Robins to be the type of an English manor-house, even if dropped on a Scotch hill-side —so we have some recognised features peculiar to our own country, as peculiar as the grey eyes and the high cheek-bones of our dear countrymen and ourselves.

Look at our old country houses,—not the castles or castellated mansions of the fifteenth and down to the seventeenth century, but what we call an old Scotch country house: a tall, *single* house, with long narrow windows; the entrance door reached by an outer stair; the roof pitched high, against the snow; crow-stepped gables; jealous windows, which you cannot look out from, without standing on tip-toe; the cork-screw stair, the entrance often at the corner formed by the meeting of the two *limbs* of the house. The line of the eaves is broken by several dormer windows, the little gables or *pediments* of which are enriched with shields of arms, crests, and ciphers. Even the lower windows have some mouldings round them; and there are string-courses, and some lines of corbelling, which break the dreary effect of the rough-cast (*harling*) covering the walls. I think these are peculiarities to form a class and style by itself—a national style. But why go about to prove what the world has determined? Every customer knows what he is ordering when he commissions an architect to build him a 'Scotch house;' and meagre and *starved* as the prototype of our style was, I think it is capable of adaptation to the wants of a more luxurious age; and if so, being native to our climate, it will be found more suitable than Greek porticoes or villas transplanted from Italy.

But that is in the country, I am told, and not in towns. I do not admit the distinction; or rather, I should say, our town Architecture has all the national features—all the peculiarities we find in country houses, with some additional

ones, such as gables turned to the street,—features originally borrowed from abroad, perhaps, but modified and adapted to our climate, our materials, our moderate fortunes,—features which altogether form a style of street Architecture that can still be recognised through the wanton violation of two centuries.

Some of our best specimens of family mansions in Edinburgh are merely country houses transplanted, and set down either in a spacious garden or in a close with garden over the way. You have only to look over Mr Drummond's charming book of drawings of Edinburgh houses to see this.

But while we have a burghal Architecture peculiar to Scotland, I cannot help thinking, though I would not speak confidently, that there is a distinguishable style peculiar to each of our old burghs. After our own city, the town I am best acquainted with is Elgin, where I was Sheriff for some years, and where I have still many bonds of connection. It is a cathedral city, you know; and, quite within my recollection—indeed, until within very recently—many of the residences of the cathedral clergy remained. Some vestiges still delight the eye, though the passion for the square packing-box house has swept most of them away. Those were grouped round the Dean's and Bishop's houses in the College, beside the old Cathedral. From thence the High Street runs west by the Tolbooth and Town-hall, to the site of Royal Castle; and the town, in truth, consisted of that one street, with closes or wynds, just like our own, branching off to each side. The manner of living was, for the burgher or merchant, and not seldom the laird from the neighbouring plain, to have his tall dwelling-house to the street, and a *pend* or archway at the end, leading to a whole long row of domestic offices, stables, byres, washing-house, and, beyond, a good-sized garden. Now for the house itself. The proper peculiar Elgin house stood on arcades; at least the street

front always—sometimes another, if it was a corner house—had its lower storey occupied with a sort of cloister of low squat pillars and semicircular arches; and these were so frequent within memory, that it seems the whole High Street must have presented a row of arcades, or *piazzas*, as the people call them, sheltering the foot passengers from the weather, except at the crossings of two or three of the wider cross-roads. Then, though unfortunately the house fronts were often rough-cast, or harled, there was always a moulding round the windows, always a row of handsome dormer windows, breaking the line of the eaves, and generally two or more ranges of smaller dormers up the slope of the steep roof; the roof itself of that mellow-coloured stone, which I believe architects reject now as too heavy, but which has a great advantage over Easdale blue slate, so far as regards the eye.

I need not tell you that all these features, so peculiar, so quaint and pretty, so compatible, I venture to think, with all street purposes—or, at any rate, so easy of adaptation—all these features, which gave character to the street and town, are ignored, disused, by our modern architects. The little place is thriving, and new houses are fast displacing the old. There are eight banks in the town! and in not one of them, not in any modern house, is there any attempt to catch the spirit or style of the old city.

You must excuse my rough and fragmentary way of bringing these things together. I have had no leisure to make my address what it ought to be, or, indeed, worthy of your attention.

If, as I think, the little city of Elgin must be allowed to have had a style of its own, it seems probable that our other old towns have some distinctive features, some Architecture that suits them and sits easy, like the plaid and kilt on a Highlander, who 'canna thole the trews.'

We naturally return to our own old city. We have not very good materials for ascertaining the old street Architecture of Edinburgh ; but such as we have enable us to say, that before the rage of demolition had set in, the High Street was a very picturesque street. Crowded indeed it was with the Weigh House, the Tolbooth, the Luckenbooths, the Cross: a little inconvenient I dare say; but not to such a degree as to warrant the absolute destruction of all our finest city memorials and monuments—objects hallowed by a thousand recollections.

You will remember there were no foot-pavements; but the kennel was not in the middle of the street, as in old Paris. The open kennels were nearly where they are at present; and the space between them and the houses was for the most part filled with fore-stairs—heavy stone staircases, with balustrades or low walls, giving entrance to the second floors of the houses. Under and among those stairs were the booths and stalls of the merchants; and all manner of attractive wares were exposed there for sale, under temporary, or at least moveable, roofs of deal. The best and most roomy dwelling-houses were down the closes; and even those looking on the great street had, for the most part, their doors of entrance from the stair in the close. The arches leading to the closes and wynds were not, I think, architecturally constructed or embellished, in which surely our forefathers missed a great and obvious and little costly opportunity of street ornamentation. The only arches of noticeable proportions were the *ports* or *bows* spanning the street—grotesque, I fear, rather than ornamental. But I think we can imagine our great street on the day of a procession—say the riding of Parliament from the Palace to the Tolbooth—the tall houses thrusting their gables to the street, the windows and fore-stairs hung with bright carpets and tapestry, the Cross, the public buildings, the booths of the merchants

dressed out for the holiday,—presenting a very picturesque and even grand appearance, more so than it could be made to do now on any occasion.

Now I am not a mere deluded antiquary. I don't wish to persuade you that everything old is beautiful. But I would like to believe—you will correct me if I am wrong—I would wish even to inculcate, that every place having a history has also a *genius loci*,—a peculiar spirit and character which must not be violated.

Well, if that is granted me, I am willing to yield, on the other hand, to all modifications, all enrichments, all embellishments, in that spirit and character. If some calamity should remove our St Giles' Church, we all should protest against filling its place with a Greek temple, were it as beautiful as the Parthenon.

I see quite well that I only remove the difficulty one step further. The question *will* recur, What is the architectural character? how is it to be followed and worked out? But I need not tell you, gentlemen,—such of you as live in Edinburgh—still more, such as make an architectural study of our city,—that it has many points very peculiar, many capable of ready adaptation to modern purposes, many which, proclaiming their origin, direct us at the same time to the proper sources for improving and enriching them.

When I see the progress of Edinburgh—its extension on every side, the constant change, and, I admit, general improvement, in the streets of our New Town—I cannot doubt that the day is at hand when we shall have some of the same energy, the same taste and wealth, directed to the restoration of our grand old High Street. Now, when that day comes, I am sure the architects of Scotland will be prepared to treat the enterprise in a worthy manner. Why should our gables not rise bold and steep as of old, with crow-steps if you please, or with those rich embellishments that seem so peculiarly

suitable to that style, which we naturally look for in the grand old cities of Flanders and Upper Germany, and which Mr Burnett has taught us to find at Nürnberg.

It is not only our tall gables that are capable of being made very effective and ornamental. Why should our architects (in towns at least) so carefully hide the roof of the house—send out the lady without her head-dress? In the modern streets of our city we have but two styles: the style of last century, where the eaves came over the wall and dripped into the street or the area (unless a lead gutter saved the passengers' heads); and our present fashion, which runs up a poor architrave or bit of cornice, trying to veil the slates and the roof altogether. I confess a great love for our genuine old Scotch style, of a range of windows breaking the eaves, and surmounted each with its little gable, affording the most appropriate position for sculptured or chiselled decorations Besides these, there may be our national corner turrets, which, when well managed, enliven the outline of our upper storeys, without flying in the face of any style.

But this is not all. These only provide for the lower stratum of the roof. I see no reason why the roof should not mount high above all these accompaniments, and bear with it tier after tier of dormers—as many as you choose—and end, if it suits the situation, in a coping of open work, of which I don't know the name: it is amazingly effective in Glammis.

I am unwilling to detain you longer on this part of my subject, which has, I dare say, been fully considered by professional men, who have found some impediment, which I cannot divine, to imitating some of the beauties of Flemish and German town architecture.

I have ventured to recommend what I think the true course for improving our street architecture. It is in some degree with art as with language. We try back to the fountains of

our mother tongue, not that we may speak or write like Chaucer or Barbour, but to gather and fix in our minds the foundations of grammar and idiom, which give us the mastery over our language, and enable us to wield it. So with Architecture. We don't want to build houses like the fifteenth century, cold and dark, without the comforts and conveniences of refined life; but if there is there the germ of our peculiar and national style, and if (as I believe) that style is capable of adaptation to all our present wants, it is for the architect, in following out his noble profession, to develop it, to modify and elaborate it, ever keeping in mind the *spirit* which can be found in every honest work of genuine art.

I mentioned just now, almost accidentally, the outer stairs —those fore-stairs which formed such a distinguishing feature of our old Scotch street Architecture. Some architects have lately revived them in country houses; nor do I know anything more ornamental than a finely balustraded stair, descending, say from a drawing-room window, to a flower-garden. The gardener loves it as a support for his best climbing plants; and the corners and balustrades are favourite stands for pots of bright geraniums. When I have the good fortune to live in one of those houses, the outer staircase is the place to arrange, on a sunny morning, a group of ladies and children for photography.

But for town, I fear, we must not hope the restoration of our old fore-stairs. They would impede the street too much, now that the chief thoroughfare is on the side pavement, and, besides, we don't need them. Our entrances are becoming more and more nearly on the ground-level. To take their place, and break the height of those grand, tall houses, which we still love in Scotland, several devices might be fallen upon. For my part, I make no objection to a projecting porch across the area (where there is one). That, I think, has not been

often tried, but I believe it will yet be a popular and frequent thing, when our eyes get somewhat reconciled to the novelty. Its utility is manifest, which, after all, is at the root of the matter, and it is capable of much variety of style and ornament.

Another relief to the monotony of tall town houses is the stone balcony—a feature not unknown either in Edinburgh or old Glasgow before the fore-stairs had disappeared, but much more to be encouraged, along with any plans of renovation from which outer stairs must be excluded. They also are capable of much diversity of style, and may receive ornament without provoking comparison with the otherwise plain, unornamented *façade.*

I have doubted whether one so little skilled in architecture should venture to criticise and censure recent buildings, the architects of which may be still alive. But in this matter my ignorance is really my excuse, and almost a warrant for expressing my opinion. It won't do to build only for architects. As one of the public, as a walker of the streets of our city, I must be allowed to say what displeases my eye, what runs counter to the character of the ground, of the mass of surrounding buildings—what violates the historical or traditionary style of our country and city.

And, in the first place, may I be bold enough to express a doubt of the suitableness of a very beautiful and very popular monument—the Scott Monument. It is not only that the great height and rich ornaments of the Antwerp spire are too much for the common, somewhat mean architecture of the majority of houses in Princes Street. It not only dwarfs the fine esplanade or terrace on which it stands, but, to my eye, it spoils the effect of all that is seen from that most advantageous point of view of our city. The Royal Institution on the Mound, the National Gallery, even the towers of the New College, even the grand features of the Castle

rock and the Old Town, are brought into unseemly contrast with the splendid interloper.

Look at it in another view. Of all men, one would think Walter Scott claimed a Scotch monument. Of all situations, 'the Heart of Midlothian' should not lightly be given up to a foreign structure. Is it to be allowed that our national architecture is so poor, so devoid of worthy types, that we must fetch a spire or pinnacle from Antwerp for a purpose so different from the intention of the original?

Following my bold and, perhaps, dangerous course, I come to another much admired ornament of our city: and no one admires more than I do the spire of the Assembly Hall; but with all that admiration, I venture to doubt whether that noble, that unrivalled situation, was properly filled by a spire. I beg you for this consideration to put out of view the top of St Giles' steeple. That is scarcely a spire in character. But, moreover, the fine old crown has so fixed itself in our eyes and minds—the minds of all Scotchmen—that even the present Town Council of Edinburgh would not think of pulling it down. It is like a fixture of nature, like the lion of Arthur Seat. But the rule of Architecture, I think—I am sure, the desire of the eye accustomed to seek picturesque effects in cities—requires a tower for such a situation, and not a spire,—such a tower as I have in my recollection, crowning the ridge of Stirling as you look from the Alloa or Tillibody side. I do not seek for authorities, although I imagine they might be found easily.

The front of the New College, I fear, does not find so many admirers as the two buildings I have mentioned. I have heard, in apology of its poorness, rather than defence, that the fund was too limited for the structure—that the situation was difficult. I am not willing to admit such excuses. A house for L.5000 may be well-proportioned and pleasing to the eye, as well as one for L.10,000; a small

house as pretty as a large one. If funds are short, abridge the size—spare the ornament—let the walls be of rubble instead of ashler. Keep the proportions of good art, and the world will be satisfied. As for situation, no doubt it is a misfortune to be doomed to build a fine church in Ireland's yard, or in the bottom of a ditch. But there are few situations about Edinburgh that have not some capability; and it is in overcoming difficulties, and turning capabilities to the best account, that an architect shows the mastery of his art. I do not admit that the New College is altogether in a bad situation. In fact, the site is very fine; the only defect is the want of light. The sun cannot shine on the principal front. Well, but the same northern exposure affects the neighbouring building, where the architect has nearly overcome the difficulty, and would, I believe, have quite surmounted it, if allowed to carry out his original plan. Before leaving the New College and its sombre, dull front, let me say that the interior—the little court of the College—which one would have judged a more difficult subject, is comparatively successful, and, in most difficult position, is really a very pleasing composition of academical Architecture. Before quite leaving that neighbourhood, too, I would venture, with all modesty, to express my doubt whether the architect of the Savings' Bank—having undoubtedly a good object in view—has not made too much of an aerial city on the top of his palace. He was anxious to avoid the monotony of our common roof, and I honour him for it; but I wish he had taken a wrinkle from Germany, rather than build stair-towers that can lead to nothing, and watch-towers which the unpoetical will believe to be highly ornamental water-closets, over which the squat little Scotch lion presides in a somewhat indelicate attitude.

I beg you to believe that I have boldly endeavoured more than once to wade through the 'slough of despond,' so as to

examine the new Cockburn Street, from which we expect so much, but hitherto without success. Even when I have penetrated through the street, it is a sad impediment to contemplation to wade ankle-deep in mud, and in constant danger from stone carts. But the glance I have got of the street does not disappoint me. I don't, indeed, find any of the effective gables which I hoped, nor the roofs (as yet) broken with plain dormers; but we at least have roofs made serviceable and ornamental, and there is novelty and lightness in the details which, if not Scotch, are from the kindred source. Like the outside world in general, I look with much interest to the junction with the High Street. A fine archway there, ornamenting and not impeding the roadway, would be a new feature in Scotch art, and, if successful, a great triumph. Moreover, a fine junction of the street to the noble range of the High Street and Canongate cannot fail to direct attention, and (by-and-bye) a tasteful renovation, to that long neglected but still recoverable street—the main artery and life channel of our historical city.

In bringing up the buildings of modern times, alas! how few are to be praised like the Register House (though not national); how many to be lamented, like the other work of the same architect—the College. The College seems to me to combine nearly all the defects a public building can exhibit. Its situation among mean, narrow, crowded streets, would be more regretted were not the outer shell so ill-proportioned and incongruous, that the less it is seen the better. But the court also is as unpleasing to the eye, as all its arrangements are unsuitable for its purpose, and inconvenient. The only exception is the truly grand hall of the Library. Such a lodging, such a material body for the soul of our great University, is like a pure and noble spirit imprisoned in a body distempered and diseased, with the additional sorrow, that the conjunction is perpetual; for under what con-

ceivable circumstances can we hope to remove the great school of literature and science from the purlieus of Nicolson Street?

And now for a matter apparently trifling. I may not have another opportunity of addressing a society interested in Architecture; and I would venture to protest against the rash, and rather ignorant, use of heraldic ornament, with which we are now threatened.

We all know how favourite heraldic blazons were with our older architects; and some of my brother antiquaries can vouch for the anxiety with which one looks, and the delight with which we find some family cognizances, or coats-of-arms, which may open the forgotten history and periods of the successive founders and repairers of the building. But we all—antiquaries and artists, and lovers of the beautiful—admit the convenience and fitness of heraldic ornament. The shape of the shield, of the knightly banner, and the squire's pennon, the helmet, the mantelling, the various accidences and outward ornaments, are capable of the prettiest and most picturesque grouping, and form materials for architectural ornament—even independent of the gorgeous colours of the herald painter—which it would be a pity to abandon in a country where the material and the masons are so excellent as here in Scotland. In my opinion, a pannel of Craigleith stone, chiselled by an Edinburgh mason, forms as fine a key-stone of an arch, or pendant of a vaulted ceiling, as the finest marble in the duomo of Milan.

But now, if we are agreed as to the convenience of heraldic ornaments, is it not worth while to bestow a very little study on the '*science*'—as it used to be called—the *science* of heraldry. It is always a dangerous thing to use a language we are ignorant of; and though the Greek or Latin rashly stuck into our speeches or our pages may for a time escape learned criticism, yet the scholar comes down upon the quotation at last, and then the explosion tumbles down more than

the poor bit of assumed learning, and does damage to the whole structure.

A friend of mine in the country has built himself a very comfortable house, and he has a taste for armorial ornaments, but no knowledge of the first principles of heraldry. Well, he puts up a number of shields over doors and windows, and, indeed, wherever he can stick one in. On one he puts arms to which he is not entitled, and which he would be the last man in the world to use if he knew that they belonged of right to a noble lord to whom he is only distantly related. On another —with plenty of arms of kindred fit for the purpose—he puts the initial letters of his own name; on another the date of his house—very proper information to be recorded on the building, but quite out of place on a *shield*, which is intended only for *arms*,—not only out of place, but offensive to a skilled eye, as everything pretending to know what is not known must be.

We need not go far from home for instances very similar. Let us avoid putting names and dates on shields. That is an easy reformation. Our venerated National Church has long assumed as a cognizance the burning bush, and as a cognizance I don't object to it. But why pretend to make coat-armour of it, and put it on a shield; and that not even in the conventional way which heraldry has fixed for representing such objects, and which every science, or supposed science, is entitled to prescribe?

One other case. Many years ago I was going over a great house then building, long since complete, and I dare say very magnificent. There was a deal of heraldry and of heraldic ornaments on the walls. Every door and window was enriched with them. But I demurred to the correctness of the heraldry. The noble owner declared his ignorance, and handed me over to his friend (and mine) the architect. But the architect—a man at the very head of his profession—quite ingenuously confessed that he also was ignorant, not

only of the family arms and nice differences which make or mar the use of such historical *records*, but of the very principles and elements of the science. 'But some one has done this, said I, and who is the author of these assertions? Notice, pray, the sculptured stones asserted, as plainly as words could do, to the herald, a particular descent, a particular pedigree; and, it occurred to me, erroneously, though no man in the kingdom has a better proved or more ancient one. Well, what was the authority? On tracing it to its source, it turned out that the architect had taken his ornaments from a a piece of embroidery work, the pattern of which had been furnished to the lady of the house by the *artiste* of a needle-work shop in Regent Street.

A very slender amount of study will not only avoid the blunders, correct the errors which offend and shock the skilled herald. A knowledge of heraldry—even the acquaintance with its first rudiments—will give a variety of resource, a freedom of handling, which the mere ignorant copyist dare not venture on.

But it is time to conclude. Indeed I have detained you too long with these rude suggestions. Some writer on Art has said that an old building is an honest thing; it shows the tone and style of its time, while we strive to hide *ours*. It is not quite true; for is it not the reproach of all modern Architecture, that we have no style of our *time?* Let us at least remember that we have a style of our *country*, capable of infinite development. Let us remember there is another honesty in Architecture. Let nothing be built without a purpose, and let every part of the building show fitness for its purpose. That is not inconsistent with just proportion and elegant form. It is, in truth, the first law of Architecture. Neither, surely, is it incompatible with ornament; but let the ornament be subordinate and subservient to utility. Like other Fine Arts, Architecture is based on the rules of good sense. What we call taste is often nothing more.

Transactions of the Architectural Institute of Scotland,
Session 1859–60.

No. IV.

AN INQUIRY

AS TO THE

TRUE PRINCIPLES FOR OUR GUIDANCE

IN THE

RESTORATION OF OLD BUILDINGS.

BY

JOHN LESSELS, ESQ., F.A.I.S.

[*Read at a Meeting of the Institute, held at Edinburgh on 8th April* 1861.]

Mr Chairman and Gentlemen,—The subject which I have the honour to bring before you this evening, is one of so much importance in itself, that I need not make any apology for its introduction. It will recommend itself to your notice by its own merits; and, although what I have got to say regarding it is sufficiently well known to my professional brethren, yet, as our convictions may not prove alike, I hope that my remarks may lead to such discussion as will elicit your opinions individually, and prove the means of strengthening each other's

hands when our aid is required in the execution of such work. Trusting, therefore, that you will find in these motives an excuse for my shortcomings otherwise, I will proceed without further preface.

It may appear, on first glance at the question before us, that nothing could be more easily answered. It might be thought that if a building has fallen into decay, from the wasting effects of time, or been overthrown by some of those eventful chances in our history, which have laid so many of our finest edifices in ruins, it should be a simple matter to rebuild it as it formerly stood, the foundations, in most cases, being extant, for although we might not be in possession of such facts as would furnish sufficient data to regulate the details of any single building requiring restoration, there may be other buildings of the same class still in existence which will afford a sufficient clue for our guidance. On closer examination, however, it will be found that the varied conditions under which every building has originally been constructed, are so many and complex, that it is a very difficult matter to bring them again into action in its reconstruction; and, consequently, that any restoration must fail, in so far as it may not be in our power to comply with all the conditions originally brought to bear on it.

In an inquiry of this kind, it may therefore not be out of place to take a hasty glance at the past history of Architecture, referring only, however, to those styles which have affected to a greater or less degree the Architecture of our own country.

In doing so, we shall find that men in early ages built merely to shelter themselves from the inclemency of the weather, and to find protection from those hostile to their interests—that as they congregated more and more together, and wealth increased, walls and towers were raised for the defence of the community, and temples for the worship of their gods—and that, from the smallest and rudest beginnings,

Architecture rose and progressed in its course, until it culminated among the Greeks, four hundred years before the Christian era, in such perfection of art, as the Parthenon at Athens: a work which, for simple and majestic grandeur, has never been surpassed, and, even in its decay, has called forth the admiration of each succeeding age—an admiration well embodied in those expressive lines of the poet:

> 'Alas! thou perfect form of grace,
> Once deem'd of gods meet dwelling-place!
> Thou master-work of Phidias' hands,—
> Thou boast and marvel of all lands!
> Perish'd thou art; yet fairer so,
> Than all that later art can show!'

Constructed of the finest marble of Pentellicus, with a precision that even yet defies the ravages of time, and adorned with sculpture so exquisite, that the very relics of it are now considered among the chiefest of England's art treasures, it seemed as if Greek art had reached the climax in its production, and could go no further, for in the four succeeding centuries it gradually declined.

The Romans, with their conquest of Greece, appear to have imbibed so much of the spirit of their art, that, with the aid of Greek artists, they were able to form a style for themselves, which, although less refined in its nature, was even more gorgeous in its beauty than the Greek, lighter in its proportions, and more capable of being adapted to suit the wants of that luxurious people. This new style reached its greatest perfection, as exemplified in the Temple of Jupiter Stator, in the Forum, Rome, and in other buildings of that period, in the reign of the Emperor Augustus, about the commencement of the Christian era, and continued in use for about four centuries. At that time, as there had been previously in the Greek, so there was then a decline in Roman art; while the overthrow of the Roman empire by the Visi-

goths, and the spoliation of Rome, on two different occasions within half a century, must have seriously affected the further advancement of Roman Architecture; and, towards the end of the sixth century, we read of its total decline.

A new element had, however, been brought into action, for the Lombards, who were at that epoch in possession of the Roman States, working with their own ideas among the relics of the preceding ages, by degrees produced a new style, generally known as the Romanesque, totally different from either Greek or Roman, in which the columnar ordinance was not inharmoniously blended with Gothic forms. This style received considerable patronage from the Papal powers, whose influence at that time was great, and many beautiful examples of it yet remain.

But as everything in this world seems designed to be transitory, the semicircular arch, which had up to then formed one of the most distinctive marks of Roman Architecture, in its turn gave way to the pointed; which, in the end of the eleventh and beginning of the twelfth centuries, we find mixed up with the semicircular, in the minor details, in France and some other portions of Europe, until, by some sudden impulse, which cannot now be easily accounted for, the pointed finally superseded the former.

To turn now to our own country—we find little account of any buildings of note, except those raised by the Romans in the southern parts of the island; and of these we are merely informed of their decline in the end of the third century.

The middle of the fifth century was marked by the arrival of the Saxons; but very little of their architecture is believed to be in existence.

In 652, we have notice of the Bishop of Lindisfearn having built a timber church on Holy Island. At a later date, we learn that Alfred the Great did much to advance Building and Architecture. The greatest and most marked change,

however, was that which followed the Conquest of England by William of Normandy, at the end of the eleventh century, at which time, or a little previous, the Romanesque, better known with us now as the Norman style, which, as we have already stated, had been in use a considerable time previously in Italy, was introduced into Britain; but with us, as there, it was only adopted to be superseded by the early pointed in the end of the twelfth century.

With the general introduction of the pointed arch, a great change took place in the principal features of our Architecture. The horizontality of the leading lines in its composition which had prevailed from the classical period downwards, had now to give way to the perpendicular arrangement, which continued and formed one of the leading features of our Gothic Architecture through its best periods, and was only departed from in its decline.

The pointed Gothic, commencing with what we term Early English, in the end of the twelfth century, passed through all its phases, and became the Architecture of this country for a period of somewhere above four centuries. It is gratifying to know that we possess excellent examples of all the different periods, and although they are of smaller size and less florid in their decorations, they will bear comparison, for beauty of proportion and elegance of design, with any of continental Europe.

Your time will not permit, neither is it necessary here, to offer any definition of the varied changes that took place in the arrangement of the details and in the sculptural decorations, nor yet the time that elapsed from the end of one period to the commencement of the one following, which produced such beautiful variety in the transitional periods. These have been so clearly defined by Rickman, Sharpe, and other writers, that I may pass them without further remark. With the beauty of the details in moulding and sculp-

ture, both in design and workmanship, however, we cannot be too much impressed, nor should we neglect any opportunity of studying them. Artists in those days worked without the cares and anxieties attendant on the prospect of an unperformed contract. The Art workmen, too, were also in many cases the designers; and thus a spirit of vigour and freedom pervaded their works which is entirely awanting in our modern productions. Each man's heart was in his work, and each, I have no doubt, vied with his neighbour whose labours should prove most excellent. Works were produced which have proved the admiration and enjoyment of ages past; and much of it seems, from the sound condition it is yet in, capable of enduring the ravages of time, and affording pleasure and instruction to future generations,—a pleasure which seems now to be widely partaken of by the community, and not only so, but desired and understood. Those who have any doubt of this, I would ask to read those beautiful verses in the 'Cornhill' of last May, entitled the 'Carver's Lesson.'

I have now reached the end of the sixteenth century as regards our Ecclesiastical Architecture. At that time it was subjected to another change by the introduction of the revived Classic or Renaissance, which the Quatro and Cinque Centists of Italy had carried to great perfection. The works of Sir Christopher Wren and Inigo Jones, with a host of others, in this style, still remain to us; and although some of these are very excellent, yet it never reached the perfection here which it had attained in the Italian States, but, on the contrary, descended with rapid strides to that chaotic darkness which overtook Architecture in the eighteenth century, when all purity of style and character seems to have been lost.

On the Civil Architecture of our own country (for we have a style of our own) much might be said, if time permitted; but I must limit my remarks to its general features.

It commenced with the lofty single square tower, which was

increased in size according to the wants of its owner, ever keeping in view and providing for the best means of defence. It was solid and massive in appearance, with its solids enormously large in proportion to the voids. Altogether widely separated in its spirit from the Ecclesiastical Architecture of the same age, except in the later periods, it possesses a certain amount of grandeur and dignity of effect peculiarly its own; while, in the later examples, the variety of heights in the gables, its round corbelled turrets and high pitched roofs, with their quaint dormer windows, give to it a rich and picturesque appearance.

Much of it was also good in execution, but the details and ornamental portions do not appear to have reached that perfection and delicacy attained in the religious structures, being in general overdrawn, rude, and quaint, and bearing much the look of having been executed by workmen copying from originals they did not quite understand or appreciate.

Such then, gentlemen, are the materials we have to deal with in the process of restoration,—an Ecclesiastical Architecture bearing in itself one connected chain of historical record from the end of the eleventh down to the end of the sixteenth century; and although few buildings bear evidence of being carried out to completion in the precise style in which they were commenced, yet there are some fine examples of such—Glasgow Cathedral, for instance—whilst many, from the changes they have undergone at different periods, contain in themselves examples of both the earliest and latest work,—such as Melrose Abbey, where the whole are so agreeably blended, that it becomes a matter of research to know where one style ends and another begins.

Each building possesses, therefore, a value in itself, not only as a work of Architecture, but an exponent of the wants and feelings of ages that are past, of which no other record may be in existence.

Many of them also, from the lapse of time and other accidental causes, present to the eye objects of such picturesque beauty, that poets and painters find in them a constant theme for the exercise of their talents, and they have now become so much enhanced in value by the associations that surround them, that one feels it to be desecration to interfere with a single stone, or even to remove one single stem of the ivy which threatens, in the luxuriance of its growth, to overthrow the very pinnacle to which it has clung in its aspirations.

If these ecclesiastical remains have become so time-hallowed and precious, surely what we have of a civil and domestic character cannot be less so. But as restoration is the order of the day, we must now proceed to it with all alacrity.

Supposing, then, that we have now got well read up in our Archæology as a due preparation, and made careful drawings of our subject,—making ourselves familiar not only with its style, but also with the spirit that pervades the work,—to carry on the operations will be our next step. But in this, the most important stage, I must now pause and ask your advice.

Let us, then, take up a case in point. The walls of the church that we have to restore had originally been well built in courses of squared stone; but have now in many places got dilapidated, and there are portions of them slightly displaced. The whole surface of the stone, more particularly on the south front, has become abraded by the weather and discoloured by time; the joints have opened, and are now irregular, while the mass of the wall is sound; the under portions of the base mouldings are also wasted, and the under plinths of the basement have got displaced. Shall we recommend the base and wall courses to be drawn out, the mouldings of the base to be re-worked, and the whole wall re-faced with new stone, polished and close-jointed?

The jamb mouldings and tracery of the windows are in many places broken; the carved work wasted, as well as some of the mullions, while others are sound and good. Is it consistent that we should reduce the thickness of the mouldings, alter their profile to suit the reduced size, and have them re-worked, to correspond with our new ashler?

I think I can anticipate a negative to both of my questions, and am afraid you think me very foolish to have asked them. Yet, gentlemen, is not this course followed every day? Have we not an instance of it in our own St Giles'? Do we not meet with it over the whole length and breadth of England? Are not some of the finest of the French cathedrals undergoing that process at present? Did I not see, only a few years ago, the beautiful Church of St Ouen, at Rouen, scraped and cleaned, until the whole surface was spike and span new, from the pinnacle of the spire to the under plinth of the base?

With such authorities as these, can I not indulge my fancy also for scraping, whitewashing, and polishing up the front of my church equally with my neighbours? Don't you see how clean and nice the front of St Giles' looks since it was cleaned? It is not a whit inferior to St John's; it has none of the dirty, dusty, worn-out look about it now: and he would be a clever fellow, who, coming into our town, could discover the 'Auld Kirk,' where Jenny Geddes' stool played so conspicuous a part, if we did not aid him in his explorations for that pile.

These are the best arguments that can be brought forward in support of the case, gentlemen, but I fear you are still unsatisfied. I need not ask you, therefore, about the pierced parapet and pinnacles I intended to have introduced to your notice, for, I doubt not, these would be negatived in like manner.

Perplexed, but not quite in despair, I think I hear a com-

forting voice whispering, 'Each of those stones you would remove has an interest and beauty in itself. They are, in fact, the component parts of the building you would restore. You don't want a new building; you wish to hand down the present building in all its integrity to future generations, as the "*veritable building*," with its various associations, that has stood there for these six centuries past. You would not perpetrate a falsehood in stone and mortar, but if you adopt such measures, you may depend on it the verdict of every educated man would be, that you had been perpetrating falsehood with fraudulent intent, as it is to produce a fraudulent appearance that you wish to do it. Remember that the want of truth in any building, as in man or woman, ultimately and effectively destroys all the interest otherwise attached to it. No other quality, however brilliant, will compensate for the want of truth; and, as one of our greatest earthly enjoyments consists in the entire confidence we repose in those we love and trust, so our greatest disappointments arise from the want of it, and we turn in like disgust from sham and pretension in one thing as from all.

If you would be an honest restorer, you must be content to follow closely in the footsteps of the original designer, not only in the spirit but in the letter, assimilating both the drawing and the workmanship to the original as far as it is possible so to do, carefully preserving all that can be preserved, adding nothing, taking nothing away. Where walls are loose, and the cement has lost its hold, the best thing you can do will be to take them down in small portions, and have them rebuilt by careful workmen, laying every stone again in its own place, and making it imperative that they shall by no means destroy the original surface: rather leave jamb or arch moulding untouched, although these may be a little wasted, if their security is not otherwise affected, than insert new for the sake of a fine surface. It would be ill-

spent time and labour wasted, to put in new work merely for the gratification of those who could not appreciate the original work. Their opinion is not worth valuing.

Window tracery is of so fragile a nature, that it may often require restoration when little more is needed; but if such has to be resorted to, it ought to be carefully worked to correspond in every way with the original. As much of the beauty of an old building often lies in the weather-staining and colours of the mosses and lichens on its surface, these should be preserved with care, except in such cases as they may be found to be injuring the building. Where the joints of the masonry require filling up, all unseemly patch-work should be avoided, as nothing is more offensive to the eye of taste than to see a picturesque old gable scarred over with patches of white mortar, or a black and oily cement, of which as well as whitewashing we have had too many examples.

Now, as the principle which guides us in the restoration of a part is equally applicable to the whole, I need not waste your time going further into details in this case. There are, however, cases in which we may be compelled to adopt another system in carrying out our restorations; but in Scotland these will prove the exception, not the rule, although in England it is painful to observe how very frequently they occur. I allude to those buildings where the stone is of such a friable nature as to crumble away rapidly under the influence of the weather, as you must all have seen, where carving, mouldings, and all trace of workmanship disappear, and a rude and shapeless mass of wall only is left.

When such does occur, the very safety of the building becomes endangered, and there is only a choice left between two evils; and, however unwilling, you will be compelled to adopt the method first suggested, of cutting out every stone

and replacing it with new. But the same principles that we held to be the rule for our guidance in the first case must also apply to this, let the new work be made a counterpart of the original in its whole style and detail.

I may mention, before proceeding further, that it is sometimes our lot to meet with some late and inferior work attached to, and destroying the character of, the early work to which it has been added. When this is the case, I think there need be no hesitation in at once removing it, and restoring the parts to their original condition; but such cases must inevitably be left to the judgment of the party employed in the restoration.

Again, we are called upon to examine a church of the fourteenth century, which is all sound and in good repair, and has long been used for the parish church, but which now, from an increase of the population, is insufficient for the accommodation of the worshippers. The hearers also complain of the pillars between the nave and aisles being in the way, the windows too small, and that the church is somewhat dark, and altogether not well suited for the present mode of worship.

How are we to deal with it? The answer to this would be very simple, if money were no consideration; for we then would recommend that a new church should be built, and the old allowed to stand as one of the landmarks of its generation. But in those days of utilitarianism, that answer would find little favour among the generality of Heritors of parishes, who probably, before they came to consult you, had made up their minds what sum they intended to expend, and only asked your assistance from some vague and undefined idea that you can help them to make a better bargain with their builder.

You may have heard, previous to these repairs being mooted, some individual Heritor congratulating the parish on

having such a fine specimen of that style of Architecture, and telling how many, eminent as antiquaries and archæologists, have visited and measured all its details; but now collectively you will soon find them ignoring all the charms of its architecture, in the desire to accomplish their ends with as little outlay as possible.

Your first thoughts, perhaps, are of pleasure in being the party selected to whom the work is to be entrusted, and you may be already considering with what a loving care you will go about it. You have not yet learned all the 'secrets of the prison-house;' as yet they have only talked to you of Architecture, and you are invited to go out and see the place, and meet the building committee; and then and there they put a damper on your enthusiasm, by acquainting you of the very liberal sum they have voted for the work, which you are also made to understand must cover the architect's charges. Possibly you now make up your mind to throw up all connection with the affair, and return to town as quickly as possible; but on second reflection you perceive that, if you won't, another will. You go to work with a heavy heart; for you know as assuredly as you have taken it in hand, that those very men who lay the onerous charge upon your shoulders without providing proper means for its fulfilment, will also take shelter under your name for all the shortcomings in carrying out the work; and you may, perhaps, have the pleasure of hearing them coolly telling their friends that architects don't understand these things nowadays, and of the world of trouble they have had in getting their church put right. I have no doubt they had much trouble, but only in reconciling their principles to the state of the exchequer.

You will pardon this long digression, gentlemen, for I have no doubt you know to your experience that it is not a mere imaginary case I have been putting: truly we

would all need strong backs, for we get much laid upon them.

Well, as we find we have not the means to build a new church, we must make the money go as far as we can on the old one; and seeing it is a profitless and expensive process altering old walls, and contrary to the principles we have been inculcating, we shall allow these to stand, and make an addition, in the shape of transepts against the east gable. Possibly that gable may require to be taken down; we know that this was frequently done in the best days of mediæval work (which will be a sop to the sticklers for precedent). It is common sense that dictates it to us; for we believe in Architecture being progressive, not, as some of its professors would have it now, stationary. We see also that, in those times, they did not hesitate to engraft the style of one period on that preceding it, when they could do so harmoniously; and as we have complaints of want of light in this building, were we to adopt a later style it may afford us more license and better meet the requirements of the day. This, however, you will observe, is not imperative—it is entirely optional. But we must take particular care not to injure or detract from the appearance of the old work; and while we preserve a true sense of the unity required in the composition, we must also endeavour to assimilate the new to the old, so that each may give value to the other, and that the character of the original work shall be enhanced and maintained so as to produce a satisfactory result. Of course we must take care that the additions, when completed, shall prove fit for their purpose, and as good as the circumstances of the case will permit.

Hitherto we have only alluded to restorations as connected with Ecclesiastical Architecture, as it is in fact public property, in interfering with which some respect should be had to the feelings of the community. We can easily conceive what would be our annoyance and disappointment, after we

had travelled some hundred miles to see and verify for ourselves the details of a church of some particular type, of which we had read, and found that our journey had been made in vain, the building having undergone the process of 'restoration' by some heartless renovator, who had destroyed all trace of its identity.

It has been said, that 'every man's house is his kingdom,' where he may reign supreme. (I suspect the author of that saying lived out of the reach of tax-gatherers.) If such, therefore, be the case, it will be evident that Domestic Architecture must be ruled by the taste of individual proprietors; but yet there are circumstances, which will readily enough suggest themselves to your minds, where the public may claim an interest in preserving a private dwelling, and that without lying under the imputation of claiming a right of roadway unrighteously. Where such is the case, public opinion, respectfully expressed, will seldom fail to command attention.

In carrying out extensive restorations, or alterations on a dwelling-house, characteristic of any particular period of Architecture, it will, in general, be desirable to adhere to that character in the new work as far as the requirements of the proprietor will admit. I repeat, as far as the requirements will admit; for as 'fitness' ought to be the groundwork of all good Architecture, adherence to a particular style will not compensate nor prove an excuse for the want of it. The original designer, no doubt, contrived his plans to suit the wants of the proprietor, in the first place, and then built in the style of the age. It will not do, therefore, to neglect the major principle for the sake of carrying out the minor. You are making additions to suit the extended wants of the present proprietor; and the character of the new work ought, in like manner, to be an extension of the original style, to meet these demands. I cannot conceive a greater absurdity, than

for a man, in the erection of a new mansion to confine the size of its windows to the dimensions of pigeon-holes, to the exclusion of all the glorious benefits of sunlight, in the silly idea that he was carrying out the pure Scotch style, overlooking altogether its progressive character.

In carrying out buildings of this description, however, another question may arise, as to whether the details and decorations shall partake of the rude, quaint character of the original, or be made to harmonize with those of the present day. I think this question is very easily solved: for rude and quaint, nay, even puerile, as some of the decorations of our Domestic Architecture often are, you will generally find that they have the germ of something good in them; and I would consider the man unworthy the name of architect, who could not seize upon the spirit of the original, and carry it out, without descending to puerility, on the one hand, or destroying its character by over-refinement on the other.

I think it has been rather the fault than otherwise to copy literally those quaint old things, both good and bad. With this I have no sympathy, and would consider it no excuse—for the perpetration of something decidedly ugly, to be told that it was a facsimile of one three hundred years old. We have not yet advanced so far in art as to be able to retrograde with impunity. The painter and sculptor, when they condescend to copy, select the most excellent models they can procure; and they only copy that they may with more certainty arrive at a knowledge of those principles by which those who preceded them attained perfection. I think it is equally important, that we, too, in our selection of examples, should choose those only that are valuable for their beauty of proportion and elegance of form.

There is another class of restoration which is now falling rapidly into disrepute, but which it would not be right to pass unnoticed. I allude to copying portions of old edifices whole-

sale, and adopting them into new work. I have no doubt that one and all of us, in the days of our 'Paul Pryism' (a great fault, I fear, in the profession), have stumbled on some newly erected lofty pile, where you could, without the assistance of your cicerone, tell whence all the individual details had been brought and what positions they had previously occupied. In such a case, although the workmanship was excellent, the different parts in themselves good, and neither money nor labour had been spared in its execution, you felt that it was still tame and unsatisfactory in its general effect: and why? Simply, because it was a piece of unmeaning patchwork, put together without regard to the real expression of the proprietor's wants or feelings, merely because such things had been done formerly. Bannerets that, in the original building from which they had been taken, were synonymous with those that had heralded a Percy, or some such gallant name, to victory on many a hard-fought field, and formed part of the pageant and associations of the 'house,' calling to the retainers' remembrance deeds of daring done by their fathers, were here useless, because they had no significance or meaning. As a whole, soulless and lifeless, you found in it the spirit of every man's work but his who had put it together; and yet, with a most wonderful degree of vanity, thought himself the veritable architect of the building, and, more than likely, did not allow even a single drawing to leave his office—no, not even that for the nail-heads of the doors—without initialing it in four-inch letters with his renowned name. I do not know how you may have felt on such occasions, but I have always found my arm nerving, and the wish rising within me for the hammer of the Iconoclast, that I might strip away some of its borrowed 'proprieties,' and show the utter contempt I felt for such heartless perpetrations.

I trust there are few now to whom this stigma will apply in the profession, as I believe that the members generally care

more for the honour of their own name than the fee to be received from their client; for, although we can't get on in the world well without that, it will always prove the last consideration in the mind of the true artist.

There is only one other class of buildings to which I shall ask your attention,—that is, the remains of our Ecclesiastical, Castellated, and Domestic Architecture. I allude to those in ruins, some of which could be renewed if it were desirable to do so, and all possessing too much interest and value to be allowed to go further into decay.

If it is desirable to preserve those relics at all, their value will be the greater that we preserve them in as much of their original integrity as is left to us; and although it would be practicable in many cases to complete what is awanting, so that when completed they could again be brought to use, I for my part would be the last who would propose such a measure. In a church, for instance, it would not be agreeable to the feelings of a congregation to sit two hours within the grey and hoary walls of such a structure; and if we cover these with plaster, and destroy the unity previously existing between the exterior and interior, the associations connected with it are destroyed, and it will then have lost just so much of its value as a relic.

I have never been so fortunate as to meet with a restoration of that kind which did not raise a greater sensation of pain than of pleasure; and I therefore think it would be better to restrict our endeavours to make good the deficiencies of what is left, than restore what is gone. While speaking of this, I think it would be within the province of the Institute to inform our noble President that there is a great deal of Melrose Abbey in such a state that, if immediate measures are not taken to repair it, the consequences may be very serious; whereas, if taken in time, it will be a simple matter to put it right. Mr Cousin, Mr Brown, and I, made a careful exami-

nation of the Abbey last season, and were much struck with the condition in which it was. I may here give our Secretary a hint that Mr Cousin might possibly be persuaded to make this a subject for a paper for our next meeting.

I will only touch upon one other subject connected with restoration, and I am done.

Much discussion has lately taken place in regard to the restoration of the old Cross of this city, and placing it on the original site.

If we may form a correct idea of this structure from the description and engraving given by Arnot, I think we may be grateful that we are spared the trouble of its removal, for a greater piece of barbarism can hardly be conceived to have existed. Can any unprejudiced person look on this engraving and honestly say, they would desire to see the original restored? If we are to have a cross, there can be no reasonable objection to taking the shaft and placing it on a few steps to raise it sufficiently above the street, as in so doing we would not be violating any principle; but to restore anything more would be a degradation.

It is evident that the civic authorities in 1756, when the substructure could not have been more than one hundred years old, put very little value upon it (although they ought to have made better provision for the shaft). With a greater knowledge of Architecture, I think it would be a bold Town Council that would now venture to renew such an edifice.

If, however, the wants of the town really demand a covered cross, with gallery for proclamations, as has been contended, let it be done, and have it entirely new: but don't trammel the architect working up old materials that are unfit for the purpose. At the same time, the shaft of the old might be erected in some convenient place, as has been done with that of Peebles, in the court of the Chambers Institution.

It would be well if we had some court connected with

our proposed Industrial Museum, in which, as in that of L'Ecole des Beaux Arts, Paris, such relics could be fitted up and preserved.

I have now, in a hurried and cursory manner, gone over the nature of the buildings requiring restoration, and the manner in which they ought to be dealt with; but in order to have done justice to the subject, it would have required two or three papers and a series of drawings to have illustrated them. The shortness of the time that has elapsed since I was asked to bring it forward has totally prevented me preparing these. If, however, it leads to the matter being properly discussed, I shall be satisfied. I am afraid I may have left much untouched that I should have gone into, and gone into a great deal that I ought to have avoided; but I have not had time to condense and systematize those desultory observations, and trust, as I before mentioned, that my desire and intention will excuse this.

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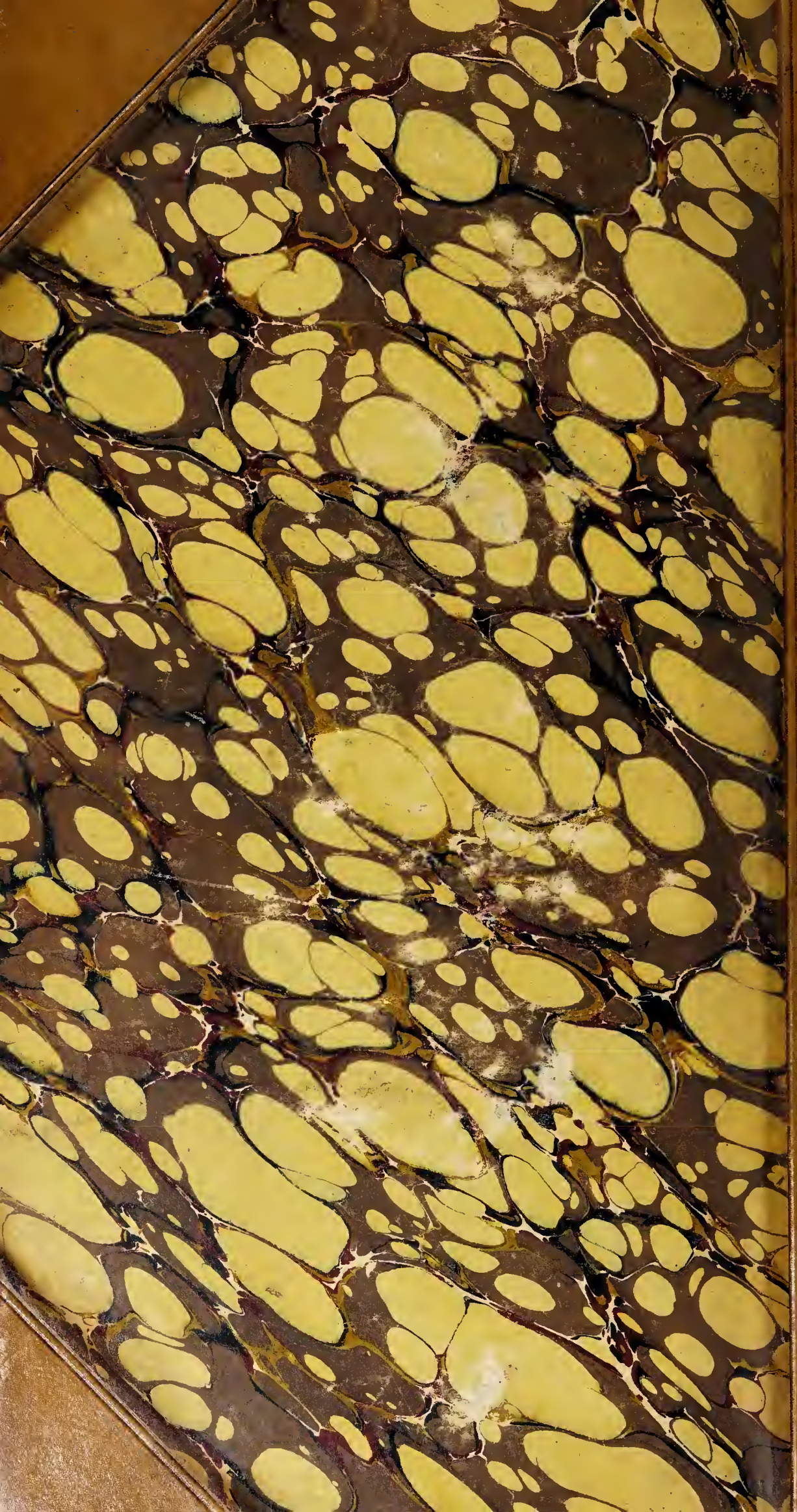
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